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Murrieta

Draft Supplemental Environmental Impact Report

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RICK
ENGINEERING COMPANY

DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT REPORT

MURRIETA GENERAL PLAN 2035

SCH NO. 2010111084

Lead Agency:

CITY OF MURRIETA
1 Town Square
Murrieta, California 92562

Contact:

Jarrett Ramaiya, City Planner
951.461.6060

Prepared by:

RICK ENGINEERING
5620 Friars Road
San Diego, California 92110

Contact:

Brian F Mooney, FAICP
619.908.3526

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1.0 Executive Summary

1.1 Project Location

The City of Murrieta is located in southeastern Riverside County. The City's Planning Area is comprised of 26,852 acres (41.96 square miles) of which 21,511 acres (33.61 square miles) is located within the City limits and 5,341 acres (8.34 square miles) is located within the City's Sphere of Influence. Surrounding cities include Menifee to the north, Temecula to the south and east, Wildomar to the west, and unincorporated Riverside County to the north, south, and east. The San Diego County border is just south of Temecula, and Orange County lies on the other side of the Santa Ana Mountains to the west. Regional access to the City is provided by the Interstates 15 and 215.

1.2 Project Summary

In 2009, the City of Murrieta initiated a comprehensive update of the General Plan which was adopted on July 19, 2011 and included a Climate Action Plan (CAP). The City's 2011 General Plan consists of the following elements: Land Use, Economic Development, Circulation, Infrastructure, Healthy Community, Conservation, Recreation and Open Space, Air Quality, Noise, Safety and Housing. In 2018, the City issued a request for proposals (RFP) to prepare a focused General Plan Update (GPU) of the City's 2011 General Plan, a CAP Update, and the preparation of the Supplemental Environmental Impact Report (SEIR). In 2019, the City augmented the scope of work to include a focused Zone Change and Zone Code Amendment. The "proposed Project" in this SEIR includes a GPU, CAP Update, and Zone Code Amendment.

Growth Assumptions

Table 3-1 as shown in Section 3, Project Description, depicts the growth assumptions for the 2011 General Plan based on existing 2018 land use designation acreages. In total, the existing General Plan based on existing 2018 land use designation acres, anticipates 44,351 residential dwelling units and 48,764,774 square feet of non-residential uses.

Table 3-2, as shown in Section 3, Project Description, depicts the proposed Project's revised growth assumptions. In total, the proposed Project anticipates 45,923 residential dwelling units and 46,359,173 square feet of non-residential uses. As depicted in Table 3-2, a new land use designation (Innovation) is being incorporated into the proposed Project.

The proposed Project's anticipated change in dwelling units and non-residential square feet over the 2035 estimated buildout from the 2011 General Plan is:

- Addition of 1,572 dwelling units
- Reduction of 2,405,601 square feet of non-residential uses

1.3 Statement of Objectives

The City of Murrieta's objectives for the proposed Project are as follows:

- Provide a focused update to the 2011 General Plan and the Zoning Code.
- Address changes in State law enacted since the adoption of the 2011 General Plan.
- Evaluate the Office Research Park designation and recommend any revisions and/or provide a new land use designation.
- Modify the organization and location of land use designations in key areas of the City.
- Update General Plan development projections to the year 2035.
- Provide a basis for informative decisions when considering development associated with implementation of the General Plan 2035 in the City of Murrieta.
- Update the City's CAP to address new State and regional goals since the adoption of the 2011 CAP and the proposed changes to land use designations in certain areas within the City as part of the GPU.
- Provide a legally defensible environmental foundation upon which discretionary actions may be evaluated.
- Provide an analysis in the SEIR related to the possible future annexation of an area into the Eastern Municipal Water District (EMWD) which is currently not served by a water district. No annexation into the EMWD is proposed as part of the proposed Project; however, the SEIR will include a facilities assessment that the Riverside Local Agency Formation Commission would require as part of the information needed for a future annexation request by the City.

1.4 Project Characteristics

The City of Murrieta's major components for the proposed Project are as follows:

- Additions, deletions, or modifications to the 2011 General Plan goals, policies, exhibits and implementation to address changes in State law enacted since the adoption of the 2011 General Plan.
- Update of General Plan development projections to the year 2035.

- Update of the existing General Plan 2035 Land Use Policy Map (Exhibit 3-2, refer to Section 3.0 Project Description) in six key areas.
- Update of the Land Use Element with a new land use designation (Innovation) and a revised mix and location of land use designations in six key areas as shown on the proposed General Plan 2035 Land Use Policy Map (Exhibit 3-3, refer to Section 3.0 Project Description).
- Revisions to the 2011 General Plan Focus Areas exhibits, text and policies.
- Creation of one new zoning district (Innovation) with a zone change and revisions to the City's Development Code to address the new zone with a Zone Code Amendment.
- Update of the existing Zoning Map (Exhibit 3-4, refer to Section 3.0 Project Description) so that it is consistent with the proposed General Plan 2035 Land Use Policy Map as shown on the proposed Zoning Map (Exhibit 3-5, refer to Section 3.0 Project Description).
- Update of emissions inventory, projections, targets, and GHG reduction strategies and measures for the CAP Update.

1.5 Project Impacts

The City of Murrieta determined that a SEIR should be prepared pursuant to the *California Environmental Quality Act* (*CEQA*) and the *CEQA Guidelines*. This SEIR assesses changes in the proposed Project, changes in circumstances, and new information that was not evaluated in the 2011 Certified EIR. Potential new impacts are determined through the process mandated by CEQA, in which the Certified EIR is used as the baseline for comparative analysis, except in the case of changed circumstances or new information, where existing conditions are used as the baseline. Section 4.0, *Environmental Analysis*, analyzes those subject areas for which changes in the proposed Project, changes in circumstances, or new information result in potentially greater impacts than those identified in the 2011 Certified EIR. Subject areas addressed in this Section include:

- Land Use and Planning
- Transportation
- Air Quality
- Greenhouse Gas Emissions
- Wildfire

Subject areas that were determined to produce no new impacts are discussed in Section 5.0¸ *Subject Areas Not Discussed in Detail, and include the following:*

- Aesthetics, Light and Glare
- Agricultural Resources

- Biological Resources
- Cultural Resources
- Geology and Soils
- Hazardous Materials
- Mineral Resources
- Noise
- Population, Housing, and Employment
- Public Resources
- Recreational Facilities
- Tribal Cultural Resources
- Water Supply
- Wastewater
- Solid Waste
- Electricity and Natural Gas
- Hydrology, Drainage, and Water Quality
- Energy

Section 4.0, Environmental Analysis, of this Program EIR provides a description of potential environmental impacts of the proposed Project and recommends mitigation measures to reduce impacts to a less than significant level, where feasible. After implementation of the proposed Project's goals and policies and the recommended mitigation measures, most of the significant or potentially significant impacts associated with implementation of the proposed Project would be reduced to a less than significant level. However, the impacts listed below could not be feasibly mitigated and would result in a significant unavoidable impacts associated with implementation of the proposed Project.

Table 1-1
Summary of Significant Unavoidable Impacts and Associated Mitigation Measures

Impacts	Level of Significance Before Mitigation	Goals and Policies in the Proposed General Plan Update	Mitigation Measures	Level of Significance After Mitigation
TRAFFIC AND CIRCULATION				
Implementation of the proposed Project could conflict with a program plan ordinance or policy addressing the circulation system, including transit roadway, bicycle and pedestrian facilities.	Potentially Significant Impact	Goals and policies identified in the 2011 General Plan (CIR-1.1 – CIR-1.14, CIR-2.1 – 2.14, CIR-3.1 – CIR-3.5, CIR-4.1 – CIR-4.3, CIR-5.1 – CIR-5.14, CIR-6.1 – CIR-6.14, CIR-7.1 – CIR-7.8, CIR-8.1 – CIR-8.15, LU-3.2, LU-23.1, LU-23.2, AQ-5.1 – AQ-5.7, N-3.4, SAF-11.1) New or revised policies of	For recommended improvements/mitigation measures see section 4.2	Significant Unavoidable Impact for the seven (7) roadway segments identified in Section 4.2. Less Than Significant Impact for all other studied roadway segments. Significant Unavoidable Impacts for the five (5) Intersections identified in Section 4.2. Less Than

Impacts	Level of Significance Before Mitigation	Goals and Policies in the Proposed General Plan Update	Mitigation Measures	Level of Significance After Mitigation
		the proposed Project (CIR-3.5, CIR-3.6, CIR-6.15 and CIR-7.9, INF-3.4)		Significant Impact for all other studied intersections.
AIR QUALITY				
Implementation of the proposed Project could result in a cumulatively considerable net increase of any criteria pollutant for which the proposed project region is non-attainment under an applicable federal or state ambient air quality standard.	Potentially Significant Impact	Goals and policies identified in the 2011 General Plan (AQ-1.1 – AQ-1.5, AQ-2.1 – AQ-2.5, AQ-3.1 – AQ-3.4, AQ-4.1 – AQ-4.4, AQ-5.1 – AQ-5.7, AQ-6.1, AQ-6.3 – AQ-6.7, AQ-7.1 – AQ-7.4, LU-8.1, LU-8.2, CIR-1.4, CIR-5.9 – CIR-5.12, and CIR-6.1 – CIR-6.12) New or revised policies of the proposed Project (LU-7.9, LU-7.10, LU-17.3, LU-17.6 and CIR-6.15)	Mitigation measures AQ-1 – AQ-24, as described in section 4.3	Significant Unavoidable Impact.
Regional Air Quality emissions resulting from operational buildout of the proposed project could impact regional air quality levels on a cumulatively considerable basis.	Potentially Significant Impact	Goals and policies identified in the 2011 General Plan (AQ-1.1 – AQ-1.5, AQ-2.1 – AQ-2.5, AQ-3.1 – AQ-3.4, AQ-4.1 – AQ-4.4, AQ-5.1 – AQ-5.7, AQ-6.1, AQ-6.3 – AQ-6.7, AQ-7.1 – AQ-7.4, LU-8.1, LU-8.2, CIR-1.4, CIR-5.9 – CIR-5.12, and CIR-6.1 – CIR-6.12) New or revised policies of the proposed Project (LU-7.9, LU-7.10, LU-17.3, LU-17.6 and CIR-6.15)	Mitigation measures AQ-1 – AQ-24, as described in section 4.3	Significant Unavoidable Impacts for construction and regional air quality, Less than Significant for localized air quality and cumulative odor impacts.

1.6 Summary of Project Alternatives

Section 6.0, Alternatives, analyzes three reasonable alternatives to the proposed Project, and evaluates the comparative merits of each alternative. Potential environmental impacts associated with the alternatives are compared to the impacts of the proposed Project. The alternatives include: No Project; Alternative 2, and Alternative 3.

NO PROJECT ALTERNATIVE

Overall, the No Project Alternative would result in similar environmental impacts as the proposed Project except in terms of air quality, energy, greenhouse gas emissions, hazards and hazardous materials, land use, population, housing and employment, traffic and circulation, and wildfire, which would be considered inferior. The No Project Alternative would be considered environmentally superior in regard to public services and utilities; however, the No Project Alternative does not reduce the significant unavoidable impacts to the environment to the extent that the proposed Project does. Additionally, the No Project Alternative would not address changes in State law enacted since the adoption of the 2011 General Plan nor include the CAP Update. Therefore, the No Project Alternative is not selected as the environmentally superior alternative to the proposed Project.

ALTERNATIVES 2 AND 3 AND THE PROPOSED PROJECT

Alternatives 2 and 3 allow for greater residential development and less non-residential development than the proposed Project overall. This increase in residential development could result in additional impacts to population, housing and employment, and public services and utilities beyond those identified by the proposed Project. However, the land use components of Alternatives 2 and 3 are very similar overall to the proposed Project and the differences in impacts would be minimal. As such, the Environmentally Superior Alternative is the proposed Project; however, as discussed, Alternatives 2 and 3 would be very similar overall to the proposed Project.

2.0 Introduction and Purpose

This document is a Draft Supplemental Environmental Impact Report (SEIR) for the proposed Project. Its purpose is to augment the previously certified Environmental Impact Report from July 21, 2011 (Certified EIR), State Clearinghouse No. 2010111084, by assessing changes to the conclusions originally reached therein which are attributable to: 1) changes in the proposed Project; 2) changes in the circumstance under which the proposed Project is undertaken; or 3) the introduction of new information of substantial importance that was not known at the time the previous EIR was certified.

This section contains a brief background of the proposed Project, further described in Section 3.0, a discussion the purpose and legal authority, scope, intended use, and format of this SEIR.

2.1 Project Background

In 2009, the City of Murrieta initiated a comprehensive update of the General Plan (2011 General Plan) which was adopted on July 19, 2011. The 2011 General Plan included an update of existing elements as well as two new elements. The 2011 General Plan comprises the following mandatory State elements: Land Use; Economic Development; Circulation; Healthy Community; Conservation; Recreation and Open Space; Air Quality; Noise; and Safety. The Housing Element was updated in a separate process. Major components of the 2011 General Plan include:

- Update of existing conditions, with year 2009 serving as the baseline year.
- Update of General Plan development projections to the year 2035. Projections for population, residential, and non-residential development have been updated for the projected horizon year.
- Additions, deletions, or modifications to the 1994 General Plan goals, policies, and implementation.
- Update the Land Use Element with reorganized and new land use designations.
- Amendment of the remaining General Plan Elements to reflect current conditions and account for development projections to year 2035.

Below is the summary of environmental impacts and mitigation measures from the 2011 General Plan.

Table 2-1
Summary of Environmental Impacts and Mitigation Measures
2011 General Plan

Impacts	Level of Significance Before Mitigation	Goals and Policies in the Proposed General Plan 2035	Mitigation Measures	Level of Significance After Mitigation
LAND USE				
Land Use Compatibility				
Implementation of the proposed General Plan 2035 could disrupt or physically divide an established community.	Less Than Significant Impact.	LAND USE ELEMENT **Goals**: LU-3, LU-8, LU-15, LU-18, LU-26, LU-27 **Policies**: LU-3.2, LU-3.3, LU-3.5, LU-8.3, LU-8.4, LU-15.1, LU-15.2, LU-15.3, LU-15.4, LU-18.1, LU-18.2, LU-18.4, LU-26.1, LU-26.2, LU-27.1	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
Federal and State Land Use Plans, Policies, or Regulations				
Implementation of the proposed General Plan 2035 could result in potential inconsistency impacts with Federal and State regulations.	Less Than Significant Impact.	CIRCULATION ELEMENT **Goals**: CIR-1, CIR-5, CIR-6, CIR-8 **Policies**: CIR-1.4, CIR-1.11, CIR-5.9, CIR-5.10, CIR-5.11, CIR-6.1, CIR-6.2, CIR-6.3, CIR-6.4, CIR-6.5. CIR-6.6, CIR-6.7, CIR-6.11, CIR-6.13, CIR-8.1 CONSERVATION ELEMENT **Goals**: CSV-1, CSV-3, CSV-4, CSV-8 **Policies**: CSV-1.3, CSV-3.1, CSV-3.2, CSV-3.3, CSV-3.5, CSV-4.1, CSV-4.2, CSV-4.3, CSV-4.4, CSV-4.5, CSV-4.6, CSV-8.1, CSV-8.2, CSV-8.3, CSV-8.4, CSV-8.5, CSV-8.6, CSV-8.7 AIR QUALITY ELEMENT **Goals:** AQ-1, AQ-3, AQ-4, AQ-5, AQ-6, AQ-7 **Policies**: AQ-1.1, AQ-1.2, AQ-1.3, AQ-1.4, AQ-1.5, AQ-3.1, AQ-3.2, AQ-3.3, AQ-3.4, AQ-4.1, AQ-4.2, AQ-4.3, AQ-4.4, AQ-5.1, AQ-5.2, AQ-5.3, AQ-5.4, AQ-5.5, AQ-5.6, AQ-5.7, AQ-6.1, AQ-6.2, AQ-6.3, AQ-6.4, AQ-6.5, AQ-6.6, AQ-6.7, AQ-7.1, AQ-7.2, AQ-7.3, AQ-7.4	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.

Impacts	Level of Significance Before Mitigation	Goals and Policies in the Proposed General Plan 2035	Mitigation Measures	Level of Significance After Mitigation
Regional/Multi-Jurisdictional Land Use Plans, Policies, or Regulations				
Southern California Association of Governments				
The proposed General Plan 2035 could result in inconsistencies with the goals of the Southern California Association of Government's Regional Comprehensive Plan, 2008 Regional Transportation Plan and the principles and strategies of the Compass Growth Visioning Program.	Less Than Significant Impact.	Refer to *Table 5.1-2* and *Table 5.1-3*.	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
County of Riverside				
The proposed General Plan 2035 could result in inconsistencies with the Riverside County Airport Land Use Compatibility Plan.	Potentially Significant Impact.	**Goals**: LU-25, **Policies**: LU-25.8, LU-25.9, LU-25.10, LU-25.11, LU-25.12	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Less Than Significant Impact.
The proposed General Plan 2035 could result in inconsistencies with the Western Riverside County Multiple Species Habitat Conservation Plan.	Less Than Significant Impact.	CONSERVATION ELEMENT **Goals**: CSV-8, **Policies**:CSV-8.1, CSV-8.2, CSV-8.5, CSV-8.6, CSV-8.7	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
Local Plans and Policies				
Implementation of the proposed General Plan 2035 could result in potential inconsistency impacts with local plans and policies.	Less Than Significant Impact.	LAND USE ELEMENT **Goals**: LU-8, LU-10, LU-12, LU-17, LU-18, LU-19, LU-20, LU-23, LU-27 **Policies**:LU-8.7, LU-10.2, LU-10.5, LU-12.3, LU-12.4, LU-17.5, LU-18.4, LU-19.1, LU-19.2, LU-20.6, LU-23.1, LU-27.1 ECONOMIC DEVELOPMENT ELEMENT **Goals**: ED-2, ED-9 **Policies**: ED-2.7, ED-2.8, ED-9.1	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
Cumulative Impacts and Mitigation Measures				
Development associated with implementation of the proposed General Plan 2035 and cumulative development could result in cumulatively considerable land use impacts.	Less Than Significant Impact.	Refer to the goals and policies referenced above in this Section 5.1.	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
POPULATION, EMPLOYMENT, AND HOUSING				
Population Growth				
Implementation of the proposed General Plan 2035 could	Less Than Significant	LAND USE ELEMENT **Goal**: LU-1	No mitigation measures beyond the goals and	Not Applicable.

Impacts	Level of Significance Before Mitigation	Goals and Policies in the Proposed General Plan 2035	Mitigation Measures	Level of Significance After Mitigation
induce population growth in the City by allowing new homes and businesses.	Impact.	**Policies**: LU-1.1, LU-1.2, LU-1.3, LU-1.4, LU-1.5, LU-1.6, LU-1.7, LU-1.8, LU-1.9 ECONOMIC DEVELOPMENT ELEMENT **Goals**: ED-2, ED-5, ED-5.1, ED-5.2, ED-5.3, ED-5.4 **Policies**: ED-2.6, ED-2.7, ED-2.8, ED-2.9 HOUSING ELEMENT **Policies**: Policy 1.1, Policy 1.6, Policy 5.1, Policy 5.2, Policy 5.5	policies identified in the proposed General Plan 2035 and Housing Element are required.	
Replacement Housing				
Implementation of the proposed General Plan 2035 could displace existing housing or persons, necessitating the construction of replacement housing.	Less Than Significant Impact.	Refer to the goals and policies referenced above in this Section 5.2.	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 and Housing Element are required.	Not Applicable.
Cumulative Impacts and Mitigation Measures				
Development associated with implementation of the proposed General Plan 2035 and cumulative development could induce population growth in the Western Riverside Council of Government's SCAG subregion.	Less Than Significant Impact.	Refer to the goals and policies referenced above in this Section 5.2.	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 and Housing Element are required.	Not Applicable.
AESTHETICS, LIGHT, AND GLARE				
Scenic Vistas				
Implementation of the proposed General Plan 2035 could have an adverse effect on a scenic vista.	Less Than Significant Impact.	LAND USE ELEMENT Goal: LU-1 Policies: LU-1.4 CONSERVATION ELEMENT **Goal:** CSV-5 **Policies**: CSV-5.1, CSV-5.2 RECREATION AND OPEN SPACE ELEMENT **Goal**: ROS-7 **Policies**: ROS-7.1, ROS-7.2, ROS-7.3	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
State Scenic Highway				
Implementation of the proposed General Plan 2035 could substantially damage scenic resources within a State scenic	Less Than Significant Impact.	No goals or policies in the proposed General Plan 2035 pertain specifically to State	No mitigation measures are required.	Not Applicable.

Impacts	Level of Significance Before Mitigation	Goals and Policies in the Proposed General Plan 2035	Mitigation Measures	Level of Significance After Mitigation
highway.		scenic highways.		
Visual Character – Short-Term				
Construction activities for future development associated with implementation of the proposed General Plan 2035 could temporarily degrade the visual character of the respective development site and/or its immediate surroundings.	Potentially Significant Impact.	No goals or policies in the proposed General Plan 2035 pertain specifically to visual character during construction.	AES-1 For future development located in or immediately adjacent to residentially zoned properties, construction documents shall include language that requires all construction contractors to strictly control the staging of construction equipment and the cleanliness of construction equipment stored or driven beyond the limits of the construction work area. Construction equipment shall be parked and staged within the project site, as distant from the residential use, as reasonably possible. Staging areas shall be screened from view from residential properties. AES-2 Construction documents shall include language requiring that construction vehicles be kept clean and free of mud and dust prior to leaving the development site. Streets surrounding the development site shall be swept daily and maintained free of dirt and debris. AES-3 Construction worker parking may be located off-site with prior approval by the City. On-street parking of construction worker vehicles on residential streets shall be prohibited.	Less Than Significant Impact.
Visual Character – Long-Term				
Future development associated	Less Than	LAND USE ELEMENT	No mitigation measures	Not Applicable.

Impacts	Level of Significance Before Mitigation	Goals and Policies in the Proposed General Plan 2035	Mitigation Measures	Level of Significance After Mitigation
with implementation of the proposed General Plan 2035 could permanently degrade the visual character of the respective development site and its immediate surroundings.	Significant Impact.	**Goals**: LU-2, LU-3, LU-9, LU-10, LU-11, LU-12, LU-20, LU-21, LU-22, LU-24, LU-27 **Policies**: LU-2.1, LU-3.1, LU-3.2, LU-3.3, LU-3.4, LU-3.5, LU-9.1, LU-10.1, LU-10.2, LU-10.5, LU-10.7, LU-10.8, LU-10.9, LU-11.1, LU-11.2, LU-11.3, LU-11.4, LU-11.5, LU-11.6, LU-11.7, LU-11.8, LU-12.1, LU-12.2, LU-12.3, LU-12.4, LU-20.1, LU-20.2, LU-20.3, LU-20.4, LU-20.7, LU-20.8, LU-20.9, LU-21.1, LU-22.1, LU-22.2, LU-22.3, LU-22.4, LU-22.5, LU-24.1, LU-27.1 CONSERVATION ELEMENT **Goals**: CSV-4, CSV-5, CSV-9, **Policies**: CSV-4.1, CSV-4.2, CSV-4.3, CSV-4.4, CSV-4.5, CSV-4.6, CSV-4.7, CSV-5.1, CSV-5.2 CSV-5.3, CSV-9.1, CSV-9.2, CSV-9.3, CSV-9.4 CSV-9.5, CSV-9.6, CSV-9.8, CSV-9.9 RECREATION AND OPEN SPACE ELEMENT **Goal**: ROS-7 **Policies**: ROS-7.1, ROS-7.2, ROS-7.3, ROS-7.4	beyond the goals and policies identified in the proposed General Plan 2035 are required.	
Light and Glare				
Future development associated with implementation of the proposed General Plan 2035 could create new sources of light/glare that could adversely affect views in the area.	Less Than Significant Impact.	LAND USE ELEMENT **Goal**: LU-20 **Policies**: LU-20.10	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
Shade and Shadows				
Future development associated with implementation of the proposed General Plan 2035 could create shade and shadows that could adversely affect adjacent land uses.	Less Than Significant Impact.	No goals or policies in the proposed General Plan 2035 pertain specifically to shade or shadows.	No mitigation measures are required.	Not Applicable.
Cumulative Impacts and Mitigation Measures				
Development associated with implementation of the proposed	Potentially Significant	Refer to the goals and policies referenced	Refer to Mitigation Measures AES-1 to AES-	Less Than Significant

Impacts	Level of Significance Before Mitigation	Goals and Policies in the Proposed General Plan 2035	Mitigation Measures	Level of Significance After Mitigation
General Plan 2035 and cumulative development could result in cumulatively considerable aesthetics, light, and glare impacts.	Impact.	above in this Section 5.3.	3. No additional mitigation measures are required.	Impact.
TRAFFIC AND CIRCULATION				
Proposed General Plan 2035 Traffic Operations				
Implementation of the proposed General Plan 2035 could conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for intersections.	Potentially Significant Impact.	CIRCULATION ELEMENT **Goals**: CIR-1, CIR-2, CIR-3, CIR-4, CIR-5, CIR-6, CIR-7, CIR-8, **Policies**: CIR-1.1, CIR-1.2, CIR-1.3, CIR-1.4, CIR-1.5, CIR-1.6, CIR-1.7, CIR-1.8, CIR-1.9, CIR-1.10, CIR-1.11, CIR-1.12, CIR-1.13, CIR-1.14, CIR-2.1, CIR-2.2, CIR-2.3, CIR-2.4, CIR-2.5, CIR-2.6, CIR-2.7, CIR-2.8, CIR-2.9, CIR-2.10, CIR-2.11, CIR-2.12 CIR-2.13, CIR-2.14, CIR-3.1, CIR-3.2, CIR-3.3, CIR-3.4, CIR-3.5, CIR-4.1, CIR-4.2, CIR-4.3, CIR-5.1, CIR-5.2, CIR-5.3, CIR-5.4, CIR-5.5, CIR-5.6, CIR-5.7, CIR-5.8, CIR-5.9, CIR-5.10, CIR-5.11, CIR-5.12, CIR-5.13, CIR-5.14, CIR-6.1, CIR-6.2, CIR-6.3, CIR-6.4, CIR-6.5, CIR-6.6, CIR-6.7, CIR-6.8, CIR-6.9, CIR-6.10, CIR-6.11, CIR-6.12, CIR-6.13, CIR-6.14, CIR-7.1, CIR-7.2, CIR-7.3, CIR-7.4, CIR-7.5, CIR-7.6, CIR-7.7, CIR-7.8, CIR-8.1, CIR-8.2, CIR-8.3, CIR-8.4, CIR-8.5, CIR-8.6, CIR-8.7, CIR-8.8, CIR-8.9, CIR-8.10, CIR-8.11, CIR-8.12, CIR-8.13, CIR-8.14, CIR-8.15 LAND USE ELEMENT **Goals**: LU-3, LU-23 **Policies**:, LU-3.2, LU-23.1, LU-23.2 AIR QUALITY ELEMENT **Goal**: AQ-5 **Policies**: AQ-5.1, AQ-5.2, AQ-5.3, AQ-5.4, AQ-	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are available.	Roadway Segments. Significant Unavoidable Impact for the roadway segments identified as LOS D, E, or F on *Exhibit 5.4-14*. Less Than Significant Impact for the roadway segments identified as LOS A, B, or C on *Exhibit 5.4-14*. Intersections. Significant Unavoidable Impacts for Intersections 1, 3, 4, 9, 10, 18, 20, 22, 25, 28, 44, 52, 53, 54, 57, 59 (refer to *Table 5.4-12*). Less Than Significant Impact for all other studied intersections.

Impacts	Level of Significance Before Mitigation	Goals and Policies in the Proposed General Plan 2035	Mitigation Measures	Level of Significance After Mitigation
		5.5, AQ-5.6, AQ-5.7 NOISE ELEMENT **Goal**: N-3 **Policies**: N-3.4 SAFETY ELEMENT Goal: SAF-11 Policies:SAF-11.1		
Congestion Management Program				
Implementation of the proposed General Plan 2035 could result in conflicts with the Riverside County Congestion Management Program.	No Impact.	Refer to the goals and policies referenced above in this Section 5.4.	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
Design Features or Incompatible Uses				
Implementation of the proposed General Plan 2035 could result in inadequate design features or incompatible uses.	Less Than Significant Impact.	Refer to the goals and policies referenced above in this Section 5.4.	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
Emergency Access				
Implementation of the proposed General Plan 2035 could result in inadequate emergency access	Less Than Significant Impact.	Refer to the goals and policies referenced above in this Section 5.4.	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
Pedestrian and Transit Facilities				
Implementation of the proposed General Plan 2035 could conflict with the performance of existing and/or planned transit systems serving the area and/or conflict with adopted transit, bicycle, or pedestrian policies, plans, or programs.	Less Than Significant Impact.	Refer to the goals and policies referenced above in this Section 5.4.	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
Cumulative Impacts and Mitigation Measures				
Development associated with implementation of the proposed General Plan 2035 and cumulative development could result in cumulatively considerable traffic and circulation impacts.	Potentially Significant Impact.	Refer to the goals and policies referenced above in this Section 5.4.	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are available.	Roadway Segments. Significant Unavoidable Impact for the roadway segments identified as LOS D, E, or F on *Exhibit 5.4-14*. Less Than Significant Impact for the roadway segments identified as LOS A, B, or C

Impacts	Level of Significance Before Mitigation	Goals and Policies in the Proposed General Plan 2035	Mitigation Measures	Level of Significance After Mitigation
				on *Exhibit 5.4-14*. Intersections. Significant Unavoidable Impacts for Intersections 1, 3, 4, 9, 10, 18, 20, 22, 25, 28, 44, 52, 53, 54, 57, 59 (refer to *Table 5.4-12*). Less Than Significant Impact for all other studied intersections.
AIR QUALITY				
Short-Term Construction Emissions				
Citywide construction activities under the proposed General Plan 2035 could result in a considerable increase of criteria pollutants, and thus, could violate air quality standards.	Potentially Significant Impact.	AIR QUALITY ELEMENT **Goals**: AQ-3, AQ-7 **Policies**:AQ-3.1, AQ-3.2, AQ-3.3, AQ-3.4, AQ-7.1, AQ-7.2, AQ-7.3, AQ-7.4	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are available.	Significant Unavoidable Impact.
Long-Term Mobile and Stationary Source Emissions				
Implementation of the proposed General Plan 2035 could result in an overall increase in mobile and stationary source emissions within the City, which could exceed South Coast Air Quality Management District air quality standards.	Potentially Significant Impact	AIR QUALITY ELEMENT **Goals**: AQ-1, AQ-2, AQ-4, AQ-5, AQ-6, AQ-7, LU-8 **Policies:** AQ-1.1, AQ-1.2, AQ-1.3, AQ-1.4, AQ-1.5, AQ-2.1, AQ-2.2, AQ-2.3, AQ-2.4, AQ-2.5, AQ-4.1, AQ-4.2, AQ-4.3, AQ-4.4, AQ-5.1, AQ-5.2, AQ-5.3,AQ-5.4, AQ-5.5, AQ-5.6,AQ-5.7, AQ-6.1, AQ-6.3,AQ-6.4, AQ-6.5, AQ-6.6, AQ-6.7, AQ-7.1, AQ-7.3,LU-8.1, LU-8.2 CIRCULATION ELEMENT **Goals**: CIR-1, CIR-5, CIR-6, **Policies**: CIR-1.4, CIR-5.9, CIR-5.10, CIR-5.11, CIR-5.12, CIR-6.1, CIR-6.2, CIR-6.3, CIR-6.4, CIR-6.5, CIR-6.6, CIR-6.7, CIR-6.8, CIR-6.9, CIR-6.10, CIR-6.11, CIR-	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are available.	Significant Unavoidable Impact.

Impacts	Level of Significance Before Mitigation	Goals and Policies in the Proposed General Plan 2035	Mitigation Measures	Level of Significance After Mitigation
		6.12 LAND USE ELEMENT **Goal:** LU-8 **Policies**: LU-8.1, LU-8.2		
Odor Impacts				
Implementation of the proposed General Plan 2035 could result in an overall increase in odors within the City.	Less Than Significant Impact.	AIR QUALITY ELEMENT **Goals**: AQ-2, AQ-6 **Policies**: AQ-2.1, AQ-2.2, AQ-2.3, AQ-2.4, AQ-2.5, AQ-6.1	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
Carbon Monoxide Hotspots				
Implementation of the proposed General Plan 2035 could result in an overall increase in carbon monoxide hotspot emissions within the City, which could exceed South Coast Air Quality Management District air quality standards.	Less Than Significant Impact.	CIRCULATION ELEMENT **Goal**: CIR-1 **Policies**: CIR-1.2, CIR-1.4, CIR-1.6, CIR-1.8	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
Consistency with Regional Plans				
The proposed General Plan 2035 may conflict with or hinder implementation of the Southern California Association of Government's Regional Comprehensive Plan guidelines and the South Coast Air Quality Management District's Air Quality Management Plan.	Less Than Significant Impact.	Refer to the goals and policies referenced above in this Section 5.5.	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
Cumulative Impacts and Mitigation Measures				
Regional air quality emissions resulting from operational buildout of the proposed General Plan 2035 could impact regional air quality levels on a cumulatively considerable basis.	Potentially Significant Impact.	Refer to the goals and policies referenced above in this Section 5.5.	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are available.	Significant Unavoidable for construction and regional air quality impacts. Less Than Significant for localized air quality and cumulative odor impacts.
GREENHOUSE GAS EMISSIONS				
Greenhouse Gas Emissions				
Greenhouse gas emissions generated by development associated with implementation of the proposed General Plan 2035 could have a significant impact on the environment.	Less Than Significant Impact.	LAND USE ELEMENT **Goals**: LU-1, LU-4, LU-5, LU-6, LU-7, LU-8, LU-9, LU-10, LU-22, LU-24, LU-25 **Policies** : LU-1.6, LU-4.3, LU-5.1, LU-5.2, LU-6.1, LU-7.4, LU-7.8, LU-8.1, LU-8.2, LU-8.4, LU-	No mitigation measures beyond the strategies, goals, and measures identified in the proposed Climate Action Plan are required.	Not Applicable.

Impacts	Level of Significance Before Mitigation	Goals and Policies in the Proposed General Plan 2035	Mitigation Measures	Level of Significance After Mitigation
		8.5, LU-8.6, LU-8.7 ,LU-8.8, LU-9.1, LU-9.2, LU-9.3, LU-9.4, LU-9.5, LU-9.6, LU-9.7, LU-9.8, LU-10.1, LU-10.2, LU-10.3, LU-10.4, LU-10.5, LU-10.6, LU-10.7, LU-10.8, LU-10.9, LU-22.6, LU-24.2, LU-24.6, LU-25.2 ECONOMIC DEVELOPMENT ELEMENT **Goals**: ED-3, ED-4, ED-5, ED-6, ED-8, ED-10, **Policies**: ED-3.1, ED-3.2, ED-3.3, ED-3.4, ED-4.2, ED-5.1, ED-6.1, ED-6.2, ED-8.1, ED-10.6 CIRCULATION ELEMENT **Goals**: CIR-1, CIR-2, CIR-5, CIR-6, CIR-7, CIR-8 **Policies**: CIR-1.1, CIR-1.9, CIR-1.11, CIR-2.3, CIR-2.5, CIR-2.6, CIR-2.7, CIR-2.12, CIR-5.9, CIR-5.10, CIR-5.11, CIR-5.14, CIR-6.1, CIR-6.2, CIR-6.3, CIR-6.4, CIR-6.5, CIR-6.6, CIR-6.12, CIR-7.1, CIR-7.2, CIR-7.3, CIR-7.4, CIR-7.5, CIR-7.6, CIR-7.7, CIR-7.8, CIR-8.1, CIR-, 8.2, CIR-8.9, CIR-8.10, CIR-8.11, CIR-8.12, CIR-8.13 INFRASTRUCTURE ELEMENT **Goals**: INF-1, INF-2 **Policies**: INF-1.15, INF-2.1, INF-2.2, INF-2.3, INF-2.4, INF-2.5 HEALTHY COMMUNITY ELEMENT **Goals**: HC-1 **Policies**: HC-1.3 CONSERVATION ELEMENT **Goals**: CSV-1, CSV-2, CSV-9, CSV-10, CSV-12, CSV-13, CSV-14, CSV-15 **Policies:** CSV-1.2, CSV-1.4, CSV-2.1, CSV-2.2, CSV-2.4, CSV-9.1,		

Impacts	Level of Significance Before Mitigation	Goals and Policies in the Proposed General Plan 2035	Mitigation Measures	Level of Significance After Mitigation
		CSV-9.2, CSV-9.3, CSV-9.4, CSV-9.5, CSV-9.6, CSV-9.7, CSV-9.8, CSV-9.9, CSV-10.1, CSV-10.2, CSV-10.3, CSV-10.4, CSV-10.5, CSV-10.6, CSV-10.7, CSV-10.8, CSV-12.1, CSV-12.2, CSV-12.3, CSV-12.4, CSV-12.5, CSV-12.6, CSV-12.7, CSV-12.8, CSV-13.1, CSV-13.2, CSV-13.3, CSV-13.4, CSV-13.5, CSV-13.6, CSV-13.7, CSV-14.1, CSV-14.2, CSV-14.3, CSV-14.4, CSV-15.1, CSV-15.2, CSV-15.3, CSV-15.4, CSV-15.5, CSV-15.6, CSV-15.7 RECREATION AND OPEN SPACE ELEMENT **Goals:** ROS-7, ROS-8, ROS-9 **Policies**: ROS-7.1, ROS-7.2, ROS-7.3, ROS-7.4, ROS-8.1, ROS-8.2, ROS-8.3, ROS-8.4, ROS-9.1, ROS-9.2, ROS-9.3, ROS-9.4, ROS-9.5 AIR QUALITY ELEMENT **Goals**: AQ-4, AQ-5, AQ-6 **Policies**: AQ-4.1, AQ-4.2, AQ-4.3, AQ-4.4, AQ-5.1, AQ-5.3, AQ-5.4, AQ-5.5, AQ-5.7, AQ-5.8, AQ-6.3 HOUSING ELEMENT **Goals**: Goal 2 **Policies**: Policy 2.3 Action: Action 2.5		
Consistency with Applicable GHG Plans, Policies or Regulations				
Implementation of the proposed General Plan 2035 could conflict with an applicable greenhouse gas reduction plan, policy, or regulation.	Less Than Significant Impact.	Refer to the goals and policies referenced above in this Section 5.6.	No mitigation measures beyond the strategies, goals, and measures identified in the proposed CAP are required.	Not Applicable.
Cumulative Impacts and Mitigation Measures				
Greenhouse gas emissions resulting from development associated with implementation of the proposed General Plan	Less Than Significant Impact.	Refer to the goals and policies referenced above in this Section 5.6.	No mitigation measures beyond the strategies, goals, and measures identified in the proposed	Not Applicable.

Impacts	Level of Significance Before Mitigation	Goals and Policies in the Proposed General Plan 2035	Mitigation Measures	Level of Significance After Mitigation
2035 and cumulative development could impact greenhouse gas emissions on a cumulatively considerable basis.			CAP are required.	
NOISE				
Short-Term Construction Noise				
Construction-related activities associated with implementation of the proposed General Plan 2035 could generate noise levels in excess of established standards.	Less Than Significant Impact.	NOISE ELEMENT **Goal**: N-4 **Policies**: N-4.1, N-4.2, N-4.3, N-4.4, N-4.5, N-4.6	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 and adherence to the City's Noise Ordinance are required.	Not Applicable.
Construction-related activities associated with implementation of the proposed General Plan 2035 could generate or expose persons or structures to excessive groundborne vibration.	Potentially Significant Impact.	NOISE ELEMENT **Goal**: N-4 **Policies**: N-4.2, N-4.3	NOI-1 The City shall require future developments to implement the following measures to reduce the potential for human annoyance and architectural/structural damage resulting from elevated groundborne noise and vibration levels. ▪ Pile driving within a 50-foot radius of historic structures shall utilize alternative installation methods where possible (e.g., pile cushioning, jetting, predrilling, cast-in-place systems, resonance-free vibratory pile drivers). ▪ The preexisting condition of all designated historic buildings within a 50-foot radius of proposed construction activities shall be evaluated during a preconstruction survey. The preconstruction survey shall determine conditions that exist before construction begins for use in evaluating damage	Less Than Significant Impact.

Impacts	Level of Significance Before Mitigation	Goals and Policies in the Proposed General Plan 2035	Mitigation Measures	Level of Significance After Mitigation
			caused by construction activities. Fixtures and finishes within a 50-foot radius of construction activities susceptible to damage shall be documented (photographically and in writing) prior to construction. All damage shall be repaired back to its preexisting condition. ▪ Vibration monitoring shall be conducted prior to and during pile driving operations occurring within 100 feet of the historic structures. Every attempt shall be made to limit construction-generated vibration levels in accordance with Caltrans recommendations during pile driving and impact activities in the vicinity of the historic structures.	
Long-Term Operational Impacts				
Future noise levels associated with implementation of the proposed General Plan 2035 could contribute to an exceedance of the City's noise standards resulting in potential noise impacts to sensitive receptors.	Potentially Significant Impact.	NOISE ELEMENT **Goals**: N-1, N-2, N-3, LU-25 **Policies**: N-1.1, N-1.2, N-1.3, N-1.4, N-2.1, N-2.2, N-2.3, N-2.4, N-2.5, N-2.6, N-2.7, N-2.8, N-2.9, N-2.10, N-3.1, N-3.2, N-3.3, N-3.4, N-3.5, N-3.6, LU-25.2, LU-25.3, LU-25.8, LU-25.9	NOI-2 Residential projects located within the 55 CNEL noise contour for the French Valley Airport shall be subject to review by the Riverside County Airport Land Use Commission and shall be required to ensure interior noise levels from aircraft operations are at or below 45 dB CNEL.	Less Than Significant Impact.
Cumulative Impacts and Mitigation Measures				
Cumulative Short-Term Construction Noise				
Cumulative short-term construction noise associated with implementation of the proposed General Plan 2035 could result in cumulatively considerable impacts.	Potentially Significant Impact.	Refer to Goal N-4 and Policies N-4.1 through N-4.6 referenced above in this Section 5.7.	Refer to Mitigation Measure NOI-1. No additional mitigation measures are required.	Less Than Significant Impact.
Cumulative Long-Term Operational Impacts				

Impacts	Level of Significance Before Mitigation	Goals and Policies in the Proposed General Plan 2035	Mitigation Measures	Level of Significance After Mitigation
Cumulative long-term operational noise associated with implementation of the proposed General Plan 2035 could result in cumulatively considerable impacts.	Potentially Significant Impact.	Refer to Goal N-3 and Policies N-3.1 through N.3.6 and Goal LU-25 and Policies LU-25.2, LU-25.3, LU-25.8, and LU-25.9 referenced above in this Section 5.7.	Refer to Mitigation Measure NOI-2. No additional mitigation measures are available.	Significant Unavoidable Impact.
GEOLOGY AND SEISMIC HAZARDS				
Fault Rupture and Seismic Groundshaking				
Implementation of the proposed General Plan 2035 could expose people and structures to potentially substantial adverse effects involving fault rupture or strong seismic groundshaking.	Potentially Significant Impact.	SAFETY ELEMENT **Goals**: SAF-2, SAF-12 **Policies**: SAF-2.1, SAF-2.2, SAF-2.3, SAF-12.1, SAF-12.2, SAF-12.3, SAF-12.4, SAF-12.5, SAF-12.6, SAF- 12.7	GEO-1 Prior to issuance of a Grading Permit for each future development project, a registered geologist or soils engineer shall prepare an area-specific Geologic Study, which shall be submitted to the Public Works or Building and Safety Department for approval. The Geologic Study shall specify the measures necessary to mitigate impacts related to fault rupture, groundshaking, landslides, liquefaction or dynamic settling, expansive or collapsible soils, lateral spreading, and other geologic and seismic hazards, if any. All recommendations in the Geologic Study shall be implemented during area preparation, grading, and construction. GEO-2 Prior to issuance of any Grading Permit, project applicants of future development projects shall comply with each of the recommendations detailed in the Geotechnical Study, and other such measure(s) as the City deems necessary to adequately mitigate potential seismic and geotechnical hazards.	Less Than Significant Impact.
Ground Failure				

Impacts	Level of Significance Before Mitigation	Goals and Policies in the Proposed General Plan 2035	Mitigation Measures	Level of Significance After Mitigation
Implementation of the proposed general plan 2035 could expose people and structures to potential substantial adverse effects from seismic-related or other types of ground failures.	Potentially Significant Impact.	Refer to the goals and policies referenced above in this Section 5.8.	Refer to Mitigation Measures GEO-1 and GEO-2. No additional mitigation measures are required.	Less Than Significant Impact.
Soil Erosion/Loss of Topsoil				
Implementation of the proposed General Plan 2035 could result in impacts related to soil erosion or loss of topsoil.	Less Than Significant Impact.	Refer to the goals and policies referenced above in this Section 5.8.	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
Soil				
Future development resulting from implementation of the proposed General Plan 2035 could result in impacts related to expansive soils, soil strength, or the potential to support septic tanks or alternative waste water disposal systems.	Potentially Significant Impact.	Refer to the goals and policies referenced above in this Section 5.8.	Refer to Mitigation Measures GEO-1 and GEO-2. No additional mitigation measures are required.	Less Than Significant Impact.
Cumulative Impacts and Mitigation Measures				
Development associated with implementation of the proposed General Plan 2035 and cumulative development could result in cumulatively considerable impacts related to seismic, geologic, and soil conditions.	Potentially Significant Impact.	Refer to the goals and policies referenced above in this Section 5.8.	Refer to Mitigation Measures GEO-1 and GEO-2. No additional mitigation measures are required.	Less Than Significant Impact.
CULTURAL RESOURCES				
Historical and Archaeological Resources				
Implementation of the proposed General Plan 2035 could impact historical and archaeological resources.	Potentially Significant Impact.	CONSERVATION ELEMENT **Goals**: CSV-9, CSV-11, **Policies**: CSV-9.1, CSV-11.1, CSV-11.2, CSV-11.3, CSV-11.4, CSV-11.5, CSV-11.6, CSV-11.7, CSV-11.8, CSV-11.9 LAND USE ELEMENT **Goals:** LU-11, LU-22, LU-24 **Policies**: LU-11.1, LU-11.7, LU-22.3, LU-22.4, LU-24.1	CR-1 Future development projects shall continue to be evaluated for cultural resources by the City of Murrieta through review by the Eastern Information Center (EIC) and notification of and consultation with the local tribes for new entitlement projects. The projects shall be evaluated for compliance with the California Environmental Quality Act (CEQA) and where feasible, avoidance of cultural resources. If, following review by the EIC and/or tribal consultation, it is	Less Than Significant Impact.

Impacts	Level of Significance Before Mitigation	Goals and Policies in the Proposed General Plan 2035	Mitigation Measures	Level of Significance After Mitigation
			determined that there is a potential for impacts to cultural resources, further cultural resources analysis by a qualified professional(s), as defined in Mitigation Measure CR-2, may be required by the City.	
Burial Sites				
Implementation of the proposed General Plan 2035 could impact unmarked burial sites.	Potentially Significant Impact.	CONSERVATION ELEMENT **Goal:** CSV-11 **Policies**: CSV-11.5	CR-2 In the event that cultural resources (archaeological, historical, paleontological) resources are inadvertently unearthed during excavation and grading activities of any future development project, the contractor shall cease all earth-disturbing activities within a 100-foot radius of the area of discovery. If not already retained due to conditions present pursuant to Mitigation Measure CR-1, the project proponent shall retain a qualified professional (i.e., archaeologist, historian, architect, paleontologist, Native American Tribal monitor), subject to approval by the City of Murrieta to evaluate the significance of the find and appropriate course of action (refer to Mitigation Measures CR-1 and CR-3). If avoidance of the resources is not feasible, requirements pursuant to Section 15064.5 of the CEQA Guidelines shall be followed. After the find has been appropriately avoided or mitigated, work in the area may resume.	Less Than Significant Impact.
Paleontological Resources				
Implementation of the proposed	Potentially	CONSERVATION	Refer to Mitigation	Less Than

Impacts	Level of Significance Before Mitigation	Goals and Policies in the Proposed General Plan 2035	Mitigation Measures	Level of Significance After Mitigation
General Plan 2035 could directly or indirectly impact a unique paleontological resource or site.	Significant Impact.	ELEMENT **Goal**: CSV-7 **Policies**: CSV-7.1, CSV-7.2	Measure CR-1. No additional mitigation measures are required.	Significant Impact.
Cumulative Impacts and Mitigation Measures				
Development associated with implementation of the proposed General Plan 2035 and cumulative development could result in cumulatively considerable impacts to cultural resources.	Potentially Significant Impact.	Refer to the goals and policies referenced above in this Section 5.9.	Refer to Mitigation Measures CR-1 and CR-2. No additional mitigation measures are required.	Less Than Significant Impact.
BIOLOGICAL RESOURCES				
Special Status Species				
Implementation of the proposed General Plan 2035 could have an adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species.	Less Than Significant Impact.	LAND USE ELEMENT **Goals**: LU-22, LU-25 **Policies**: LU-22.3, LU-22.4, LU-25.1 CONSERVATION ELEMENT **Goals**: CSV-3, CSV-4, CSV-5, CSV-8, **Policies**: CSV-3.5, CSV-4.1, CSV-4.3, CSV-4.4, CSV-4.5, CSV-4.6, CSV-5.1, CSV-8.1, CSV-8.2, CSV-8.3, CSV-8.4, CSV-8.5, CSV-8.6 RECREATION AND OPEN SPACE ELEMENT **Goal**: ROS-7 **Policies**: ROS-7.1, ROS-7.2, ROS-7.3, ROS-7.4	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
Sensitive Vegetation Communities				
Implementation of the proposed General Plan 2035 could have an adverse effect on a sensitive vegetation community, including riparian habitat and federally protected wetlands.	Less Than Significant Impact.	Refer to the goals and policies referenced above in this Section 5.10.	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
Wildlife Movement Corridors				
Implementation of the proposed General Plan 2035 could interfere with an established wildlife corridor.	Less Than Significant Impact.	Refer to the goals and policies referenced above in this Section 5.10.	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
Local Policy/Ordinance Consistency				

Impacts	Level of Significance Before Mitigation	Goals and Policies in the Proposed General Plan 2035	Mitigation Measures	Level of Significance After Mitigation
Implementation of the proposed General Plan 2035 could conflict with a local policy or ordinance protecting biological resources.	Less Than Significant Impact.	Refer to the goals and policies referenced above in this Section 5.10, along with the following goal and policy. CONSERVATION ELEMENT **Goal**: CSV-9, CSV-9.1	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
Western Riverside County MSHCP Consistency				
Implementation of the proposed General Plan 2035 could conflict with the provisions of the Western Riverside County MSHCP.	Less Than Significant Impact.	Refer to the goals and policies referenced above in this Section 5.10.	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
Cumulative Impacts and Mitigation Measures				
Development associated with implementation of the proposed project and cumulative development could result in cumulatively considerable impacts to biological resources.	Less Than Significant Impact.	Refer to the goals and policies referenced above in this Section 5.10.	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
AGRICULTURAL RESOURCES				
Conversion of Farmland to Non-Agricultural Use				
Implementation of the proposed General Plan 2035 could result in conversion of farmland to non-agricultural use, including land shown on the 2008 Farmland Mapping and Monitoring program, as unique farmland.	Less Than Significant Impact.	CONSERVATION ELEMENT **Goal**: CSV-10 **Policies**: CSV-10.1, SV-10.2, CSV-10.3, CSV-10.4, CSV-10.5, CSV-10.6, CSV-10.7 LAND USE ELEMENT **Goals**: LU-2, LU-20 **Policies**: LU-2.1, LU-20.6, LU-20.7	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
Zoning and Williamson Act Contracts				
Implementation of the proposed General Plan 2035 could conflict with existing zoning for agricultural uses, or a Williamson Act contract.	No Impact.	No goals or policies in the proposed General Plan 2035 pertain specifically to Williamson Act Contracts.	No mitigation measures are required.	Not Applicable.
Cumulative Impacts and Mitigation Measures				
Development associated with implementation of the proposed General Plan 2035 and other cumulative development could result in cumulatively considerable impacts to agricultural resources.	Less Than Significant Impact.	Refer to the goals and policies referenced above in this Section 5.11.	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.

Impacts	Level of Significance Before Mitigation	Goals and Policies in the Proposed General Plan 2035	Mitigation Measures	Level of Significance After Mitigation
MINERAL RESOURCES				
Mineral Resource Zones				
Implementation of the proposed General Plan 2035 could result in impacts to mineral resources not yet identified.	Less Than Significant Impact.	CONSERVATION ELEMENT **Goal:** CSV-6 **Policies**: CSV-6.1	No mitigation measures beyond the goals and policies measures identified in the proposed General Plan 2035 are required.	Not Applicable
Mineral Resource Recovery Sites				
Implementation of the proposed General Plan 2035 could result in impacts to mineral resource recovery sites.	Less Than Significant Impact.	Refer to the goals and policies referenced above in this Section 5.12.	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
Cumulative Impacts and Mitigation Measures				
Development associated with implementation of the proposed General Plan 2035 and other cumulative development could result in cumulatively considerable impacts to unknown mineral resources.	Less Than Significant Impact.	Refer to the goals and policies referenced above in this Section 5.12.	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
HYDROLOGY, DRAINAGE, AND WATER QUALITY				
Water Quality				
Implementation of the proposed General Plan 2035 could violate water quality standards and waste discharge requirements.	Potentially Significant Impact.	INFRASTRUCTURE ELEMENT **Goal:** INF-1 **Policies**: INF-1.1, INF-1.2, INF-1.4, INF-1.6, INF-1.7, INF-1.8, INF-1.9, INF-1.10, INF-1.11, INF-1.12, INF-1.13, INF-1.14, INF-1.15, INF-1.16, INF-1.18, INF-1.19 CONSERVATION ELEMENT **Goals**: CSV-3, CSV-4 **Policies**: CSV-3.1, CSV-3.2, CSV-3.3, CSV-3.4, CSV-3.5, CSV-4.1, CSV-4.2, CSV-4.3, CSV-4.4, CSV-4.5, CSV-4.6	HYD-1 Prior to issuance of any Grading or Building Permit, and as part of the future development's compliance with the NPDES requirements, a Notice of Intent shall be prepared and submitted to the San Diego RWQCB providing notification and intent to comply with the State of California General Construction Permit. Also, a Stormwater Pollution Prevention Plan (SWPPP) shall be reviewed and approved by the Director of Public Works and the City Engineer for water quality construction activities on-site. A copy of the SWPPP shall be available and implemented at the construction site at all times. The SWPPP shall outline the source control and/or treatment control	Less Than Significant Impact.

Impacts	Level of Significance Before Mitigation	Goals and Policies in the Proposed General Plan 2035	Mitigation Measures	Level of Significance After Mitigation
			BMPs to avoid or mitigate runoff pollutants at the construction site to the "maximum extent practicable." All recommendations in the Plan shall be implemented during area preparation, grading, and construction. The project applicant shall comply with each of the recommendations detailed in the Study, and other such measure(s) as the City deems necessary to mitigate potential stormwater runoff impacts. HYD-2 Prior to issuance of any Grading Permit, future development projects shall prepare, to the satisfaction of the Director of Public Works and the City Engineer, a Water Quality Management Plan or Stormwater Mitigation Plan, which includes Best Management Practices (BMPs), in accordance with the Riverside County DAMP and the Murrieta WQMP. All recommendations in the Plan shall be implemented during post construction/operation phase. The project applicant shall comply with each of the recommendations detailed in the Study, and other such measure(s) as the City deems necessary to mitigate potential water quality impacts.	
Groundwater Depletion				
Development associated with	Less Than	CONSERVATION	No mitigation measures	Not Applicable.

Impacts	Level of Significance Before Mitigation	Goals and Policies in the Proposed General Plan 2035	Mitigation Measures	Level of Significance After Mitigation
implementation of the proposed General Plan 2035 could deplete groundwater supplies.	Significant Impact.	ELEMENT **Goal**: CSV-1 **Policies**: CSV-1.1, CSV-1.2, CSV-1.3, CSV-1.4, CSV-1.5, CSV-1.6	beyond the goals and policies identified in the proposed General Plan 2035 are required.	
Drainage System Capacity				
Development associated with implementation of the proposed General Plan 2035 could create or contribute to runoff water which could exceed the capacity of existing or planned storm water drainage systems for provide substantial additional sources of polluted runoff.	Potentially Significant Impact.	Refer to the goals and policies referenced above in this Section 5.13.	Refer to Mitigation Measures HYD-1 and HYD-2. No additional mitigation measures are required.	Less Than Significant Impact.
Drainage Patterns				
Development associated with implementation of the proposed General Plan 2035 could result in alteration of drainage patterns of the site or area, including alteration of a stream or river, resulting in substantial erosion, flooding, or significant risk of loss.	Less Than Significant Impact.	Refer to the goals and policies referenced above and below in this Section 5.13.	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
Flooding				
Development associated with implementation of the proposed General Plan 2035 could result in impacts related to a 100-year flood event.	Less Than Significant Impact.	SAFETY ELEMENT **Goal**: SAF-3 **Policies**: SAF-3.1, SAF-3.2, SAF-3.3, SAF-3.4, SAF-3.5, SAF-3.6	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
Dam Inundation				
Future development associated with implementation of the proposed General Plan 2035 could result in urban uses being located in dam inundation areas of the City.	Less Than Significant Impact.	SAFETY ELEMENT **Goal:** SAF-4 **Policies**: SAF-4.1, SAF-4.2, SAF-4.3	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
Inundation By Seiche, Tsunami, or Mudflow				
Development associated with implementation of the proposed General Plan 2035 could result in project inundation by seiche, tsunami, or mudflow.	Less Than Significant Impact.	There are no goals or policies that pertain specifically to seiche or tsunami. Refer to the goals and policies referenced above for flooding.	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.

Impacts	Level of Significance Before Mitigation	Goals and Policies in the Proposed General Plan 2035	Mitigation Measures	Level of Significance After Mitigation
Cumulative Impacts and Mitigation Measures				
Development associated with implementation of the proposed General Plan 2035 and cumulative development could result in cumulatively considerable impacts related to hydrology, drainage, and water quality.	Potentially Significant Impact.	Refer to goals and policies referenced above in this Section 5.13.	Refer to Mitigation Measure HYD-1 and HYD-2. No additional mitigation measures are required.	Less Than Significant Impact.
HAZARDS AND HAZARDOUS MATERIALS				
Hazardous Materials Use, Generation, Transport, or Disposal				
Future development in accordance with the proposed General Plan 2035 could result in an increased risk of upset associated with the routine use, generation, transport, or disposal of hazardous materials, which may potentially pose a health or safety hazard.	Potentially Significant Impact.	SAFETY ELEMENT **Goals**: SAF-1, SAF-8 **Policies**: SAF-1.2, SAF-1.3, SAF-1.5, SAF-8.1, SAF-8.2, SAF-8.3, SAF-8.4, SAF-8.5, SAF-8.6, SAF-8.7, SAF-8.8, SAF-8.9, SAF-8.10, SAF8.11, SAF-8.12, SAF-8.13, SAF-8.14	HHM-1 The Community Development Department, in cooperation with the Murrieta Fire & Rescue Department and the Riverside County Community Health Agency, Materials Management Division, shall provide information to businesses on viable alternatives to hazardous materials. Create an informational pamphlet with existing hazardous material substitutions and retailers that sell the materials. Offer the information to applicable business owners who are required to file as a hazardous waste handler in the City. HHM-2 The Community Development Department, in cooperation with the Murrieta Fire & Rescue Department and the Riverside County Community Health Agency, Materials Management Division, provide information on viable alternatives to household hazardous materials on the City's website so households may use alternatives. Information will also	Less Than Significant Impact.

Impacts	Level of Significance Before Mitigation	Goals and Policies in the Proposed General Plan 2035	Mitigation Measures	Level of Significance After Mitigation
			educate the public to the health, safety, and environmental benefits of using non-hazardous substitutions.	
Accidental Release of Hazardous Materials				
Accidental release of hazardous materials used, stored, or transported in the City as a result of implementation of the proposed General Plan 2035 could result in a public health risk.	Potentially Significant Impact.	Refer to the goals and policies referenced above in this Section 5.14.	Refer to Mitigation Measures HHM-1 and HHM-2. In addition, the following mitigation is recommended. HHM-3 Prior to development approval on a project-by-project basis, the project applicant shall confirm the presence or absence of hazardous materials pertaining to the release of hazardous materials into the soil, surface water, and/or groundwater. If necessary, development shall undergo site characterization and remediation on a project-by-project basis, per applicable Federal, State, and/or local standards and guidelines set by the applicable regulatory agency.	Less Than Significant Impact.
Hazardous Materials Sites				
Future development associated with implementation of the proposed General Plan 2035 could impact hazardous material sites listed on government code section 65962.5 and create a significant hazard to the public or the environment.	Potentially Significant Impact.	Refer to the goals and policies referenced above in this Section 5.14.	Refer to Mitigation Measures HHM-1 though HHM-3. No additional mitigation measures are required.	Less Than Significant Impact.
Airport Hazards				
New structures built within the vicinity of the local airport or private airstrip could result in a safety hazard for people residing or working within the area.	Potentially Significant Impact.	LAND USE ELEMENT **Goal**: LU-25 **Policies**: LU-25.9, LU-25.8, LU-25.10, LU-25.11, LU-25.12	HHM-4 The project applicant shall comply with the requirements of the Federal Aviation Administration (FAA) should any portions of the development be within a height overlay review zone or encroach within	Less Than Significant Impact.

Impacts	Level of Significance Before Mitigation	Goals and Policies in the Proposed General Plan 2035	Mitigation Measures	Level of Significance After Mitigation
			an imaginary surface surrounding the French Valley Airport. A Notice of Proposed Construction or Alteration (Form 7460-1) may be required by the FAA in accordance with Federal Aviation Regulations Part 77.	
Emergency Response				
Future development associated with implementation of the General Plan 2035 could result in interference with an adopted emergency response or evacuation plan.	No Impact.	Refer to the goals and policies referenced above in this Section 5.14.	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
Cumulative Impacts and Mitigation Measures				
Development associated with implementation of the proposed General Plan 2035 and cumulative development could result in cumulatively considerable impacts to public health and safety.	Potentially Significant Impact.	Refer to the goals and policies referenced above in this Section 5.14.	Refer to Mitigation Measures HHM-1 through HHM-4. No additional mitigation measures are required.	Less Than Significant Impact.
WATER SUPPLY				
Water Supply and Distribution				
Implementation of the proposed General Plan 2035 could result in increased demand for water supplies and infrastructure within the City.	Less Than Significant Impact.	CONSERVATION ELEMENT **Goals**: CSV-1, CSV-2, CSV-9, CSV-15 **Policies**: CSV-1.1, CSV-1.2, CSV-1.3, CSV-1.4, CSV-1.5, CSV-1.6, CSV-2.1, CSV-2.2, CSV-2.3, CSV-2.4, CSV-2.5, CSV-9.1, CSV-9.2, CSV-9.3, CSV-9.4, CSV-9.5, CSV-9.6, CSV-9.8, CSV-9.9, CSV-15.5, CSV-15.6 INFRASTRUCTURE ELEMENT **Goal**: INF-1 **Policies**: INF-1.1, INF-1.2, INF-1.3, INF-1.4, INF-1.5, INF-1.6, INF-1.7, INF-1.8, INF-1.9, INF-1.10, NF-1.21, INF-1.22, INF-1.23, INF-1.24	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
Cumulative Impacts and Mitigation Measures				
Development associated with implementation of the proposed General Plan 2035 and other cumulative development could result in cumulatively	Less Than Significant Impact.	Refer to the goals and policies referenced above in this Section 5.15.	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.

Impacts	Level of Significance Before Mitigation	Goals and Policies in the Proposed General Plan 2035	Mitigation Measures	Level of Significance After Mitigation
considerable impacts to water resources including increased demand for water supplies and infrastructure.				
WASTEWATER				
Implementation of the proposed General Plan 2035 could result in increased demand for wastewater services and infrastructure.	Potentially Significant Impact.	INFRASTRUCTURE ELEMENT **Goal**: INF-1 **Policies:** INF-1.1, INF-1.2, INF-1.3, INF-1.4, INF-1.5, INF-1.6, INF-1.7, INF-1.8, INF-1.9, INF-1.10, INF-1.21 CONSERVATION ELEMENT **Goal:** CSV-1 **Policies**: CSV-1.1, CSV-1.2, CSV-1.3, CSV-1.4, CSV-1.6	WW-1 Prior to issuance of a wastewater permit for any future development project, the Project Applicant shall pay applicable connection and/or user fees to RCWD, EVMWD, WMWD, or EMWD. WW-2 Prior to issuance of a building permit for any future development project, the Project Applicant shall prepare an engineering study to support the adequacy of the sewer systems and submit the engineering study to the City for review and approval. Any improvements recommended in the engineering study shall be installed prior to the certificate of occupancy for the development project. WW-3 Prior to issuance of a building permit for any future development project, the Project Applicant shall provide evidence that the RCWD, EVMWD, WMWD, or EMWD has sufficient wastewater transmission and treatment plant capacity to accept sewage flows from buildings for which building permits are being requested.	Less Than Significant Impact.
Cumulative Impacts and Mitigation Measures				
Development associated with implementation of the proposed General Plan 2035 and other	Potentially Significant Impact.	Refer to the goals and policies referenced above in this Section	Refer to Mitigation Measures WW-1, WW-2, and WW-3. No additional	Less Than Significant Impact.

Impacts	Level of Significance Before Mitigation	Goals and Policies in the Proposed General Plan 2035	Mitigation Measures	Level of Significance After Mitigation
cumulative development could result in cumulatively considerable impacts to wastewater systems due to increased demand and creating the need for additional facilities.		5.16.	mitigation measures are required.	
FIRE PROTECTION				
Fire Protection Services and Facilities				
Buildout of the City in accordance with the proposed General Plan 2035 could result in the need for additional fire facilities or personnel.	Less Than Significant Impact.	SAFETY ELEMENT **Goals**: SAF-5, SAF-6, **Policies**: SAF-5.1, SAF-5.2, SAF-5.3, SAF-5.4, SAF-5.5, SAF-6.1, SAF-6.2, SAF-6.3, SAF-6.4, SAF-6.5, SAF-6.6, SAF-6.7, SAF-6.8, SAF-6.9	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
Wildland Fire Hazards				
Buildout of the City in accordance with the proposed General Plan 2035 could increase the number of homes or businesses susceptible to wildland fire hazards.	Potentially Significant Impact.	SAFETY ELEMENT **Goal**: SAF-7 **Policies**: SAF-7.1, SAF-7.2, SAF-7.3, SAF-7.4, SAF-7.5	FP-1 The Murrieta Fire & Rescue Department shall review future development projects to determine if a Fuel Modification Plan is required. If required, project applicants shall prepare the Fuel Modification Plan in accordance with Fire & Rescue Department requirements prior to the issuance of a grading or building permit. FP-2 Brush clearance shall be conducted prior to initiation of construction activities in accordance with Murrieta Fire & Rescue Department requirements. FP-3 Adequate access to all buildings on the project site shall be provided for emergency vehicles during the building construction process. FP-4 Adequate water availability shall be provided to service construction activities.	Less Than Significant Impact.

Impacts	Level of Significance Before Mitigation	Goals and Policies in the Proposed General Plan 2035	Mitigation Measures	Level of Significance After Mitigation
Cumulative Impacts and Mitigation Measures				
Development associated with implementation of the proposed General Plan 2035 and cumulative development could result in cumulatively considerable impacts to fire protection personnel, services, and facilities.	Less Than Significant Impact.	Refer to the goals and policies referenced above in this Section 5.17.	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
POLICE PROTECTION				
Buildout of the City in accordance with the proposed General Plan 2035 could result in the need for additional police facilities or personnel.	Less Than Significant Impact.	SAFETY ELEMENT **Goals**: SAF-9, SAF-10, SAF-11 **Policies**: SAF-9.1, SAF-9.2, SAF-9.3, SAF-9.4, SAF-9.5, SAF-9.6, SAF-9.7, SAF-9.8, SAF-10.1, SAF-10.2, SAF-10.3, AF-10.4, SAF-11.1, AF-11.2, SAF-11.3, SAF-11.4	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
Cumulative Impacts and Mitigation Measures				
Development associated with implementation of the proposed General Plan 2035 and cumulative development could result in cumulatively considerable impacts to police protection personnel, services, and facilities.	Less Than Significant Impact.	Refer to the goals and policies referenced above in this Section 5.18.	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
SCHOOL FACILITIES				
Buildout of the City in accordance with the proposed General Plan 2035 could result in adverse physical impacts to facilities within the Murrieta Valley Unified School District, Menifee Unified School District, Perris Unified School District, and Hemet Unified School.	Potentially Significant Impact.	No goals or policies in the proposed General Plan 2035 pertain specifically to school facilities.	SCH-1 Prior to the issuance of certificate of occupancy, individual project applicants shall submit evidence to the City of Murrieta that legally required school impact mitigation fees have been paid per the mitigation established by the applicable school district.	Less Than Significant Impact.
Cumulative Impacts and Mitigation Measures				
Development associated with implementation of the proposed General Plan 2035 and other cumulative development could result in cumulatively considerable impacts to school facilities.	Potentially Significant Impact.	No goals or policies in the proposed General Plan 2035 pertain specifically to school facilities.	Refer to Mitigation Measure SCH-1. No additional mitigation measures are required.	Less Than Significant Impact.
PARKS AND RECREATIONAL FACILITIES				
Implementation of the proposed General Plan 2035 could result	Potentially Significant	RECREATION AND OPEN SPACE	No mitigation measures beyond the goals and	Significant Unavoidable

Impacts	Level of Significance Before Mitigation	Goals and Policies in the Proposed General Plan 2035	Mitigation Measures	Level of Significance After Mitigation
in impacts to the adequate availability of parkland, recreational facilities, and trails within the City.	Impact.	ELEMENT **Goals**: ROS-1, ROS-2, ROS-3, ROS-4, ROS-5, ROS-6, ROS-7, ROS-8, ROS-9 **Policies**: ROS-1.1, ROS-1.2, ROS-1.3, ROS-1.4, ROS-2.1, ROS-2.2, ROS-2.3, ROS-3.1, ROS-3.2, ROS-3.3, ROS-3.4, ROS-3.5, ROS-3.6, ROS-3.7, ROS-4.1, ROS-4.2, ROS-4.3, ROS-4.4, ROS-5.1, ROS-5.2, ROS-5.3, ROS-5.4, ROS-6.1, ROS-6.2, ROS-6.3, ROS-6.4, ROS-6.5, ROS-7.1, ROS-7.2, ROS-7.3, ROS-7.4, ROS-8.1, ROS-8.2, ROS-8.3, ROS-8.4, ROS-9.1, ROS-9.2, ROS-9.3, ROS-9.4, ROS-9.5 CIRCULATION ELEMENT **Goal:** CIR-8 **Policies**: CIR-8.11, CIR-8.12	policies identified in the proposed General Plan 2035 are available.	Impact.
Cumulative Impacts and Mitigation Measures				
Development associated with implementation of the proposed General Plan 2035 and cumulative development could result in cumulatively considerable impacts to parks and recreational facilities.	Potentially Significant Impact.	Refer to goals and policies referenced above in this Section 5.20.	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are available.	Significant Unavoidable Impact.

Impacts	Level of Significance Before Mitigation	Goals and Policies in the Proposed General Plan 2035	Mitigation Measures	Level of Significance After Mitigation
SOLID WASTE				
Landfill Capacity				
Implementation of the proposed General Plan 2035 could result in demands on local landfills in exceedance of capacity current capacity constraints.	Less Than Significant Impact.	CONSERVATION ELEMENT **Goal**: CSV-13 **Policies**: CSV-13.1, CSV -13.2, CSV-13.3, CSV-13.4, CSV-13.5, CSV-13.6, CSV-13.7	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
Cumulative Impacts and Mitigation Measures				
Development associated with implementation of the proposed General Plan 2035 and other cumulative development could result in cumulatively considerable impacts related to solid waste disposal services and landfill disposal capacity.	Less Than Significant Impact.	Refer to the goals and policies referenced above in this Section 5.21.	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
ELECTRICITY AND NATURAL GAS				
Electricity				
Implementation of the proposed General Plan 2035 could result in increased demand for electricity provided within the City.	Less Than Significant Impact.	INFRASTRUCTURE ELEMENT **Goal**: INF-1 **Policies**: INF-1.2, INF-1.5, INF-1.7 CONSERVATION ELEMENT **Goal**: CSV-12 **Policies**: CSV-12.1	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
Natural Gas				
Implementation of the proposed General Plan 2035 could result in increased demand for natural gas provided within the City.	Less Than Significant Impact.	Refer to the goals and policies referenced above in this Section 5.22.	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.
Cumulative Impacts and Mitigation Measures				
Development associated with implementation of the proposed General Plan 2035 and other cumulative development could result in cumulatively considerable impacts to electrical and/or natural gas services and facilities.	Less Than Significant Impact.	Refer to the goals and policies referenced above in this Section 5.22.	No mitigation measures beyond the goals and policies identified in the proposed General Plan 2035 are required.	Not Applicable.

In 2018, the City issued a request for proposals (RFP) to prepare a focused General Plan Update (GPU) of the City's 2011 General Plan, a CAP Update, and the preparation of the SEIR. In 2019, the City augmented the scope of work to include a focused Zone Change and Zone Code Amendment. The proposed Project in this SEIR includes a

GPU, CAP Update, and Zone Code Amendment. Section 3.0, *Project Description*, describes the proposed Project in further detail.

2.2 Purpose and Legal Authority

The purpose of this document is to evaluate proposed changes associated with the proposed Project to the 2011 General Plan as analyzed in the Certified EIR and to demonstrate that an SEIR is an adequate and complete document under the California Environmental Quality Act (CEQA) and the CEQA Guidelines (14 California Code of Regulations [CCR] Section 1500 et seq.).

CEQA Section 15162 directs that, once an EIR has been certified for a project, no subsequent EIR shall be prepared unless there is a substantial change in the project or the circumstances under which the project was undertaken that would:

1. Create new significant impacts

2. Substantially increase the severity of previously identified significant impacts

3. Add new information of substantial importance which was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified showing (i) new or substantially more severe significant impacts, (ii) mitigation measures or alternatives previously found not to be feasible are, in fact, feasible, or (iii) new mitigation measures or alternatives considerably different from those previously analyzed would substantially reduce one or more significant impacts, but the project proponents decline to adopt them.

As stated in Section 15163 of the CEQA Guidelines, the Lead Agency may choose to prepare a supplemental EIR rather than a subsequent EIR if:

1. Any of the conditions described in Section 15162 would require the preparation of a subsequent EIR

2. Only minor additions or changes would be necessary to make the previous EIR adequately apply

A SEIR need only contain the information necessary to make the previous EIR adequate for the project as revised. When the Lead Agency decides whether to approve the project, the decision-making body shall consider the previous EIR as revised by the SEIR. A finding under Section 15091 must be made for each significant effect shown in the previous EIR as revised in the SEIR.

Pursuant to Section 15163 (a)(2), this SEIR is adequate because only minor additions and changes would be necessary to make the Certified EIR adequately apply to the Project. This SEIR augments the Certified EIR to the extent necessary to address new information and changes to the original project. It also examines mitigation measures

and project alternatives. Preparing an SEIR allows the City to respond to changed circumstances or new information without requiring that the environmental review process begin completely anew.

2.3 SEIR Scope

This SEIR examines changes in the proposed Project, changes in circumstances, and new information that was not evaluated in the Certified EIR. Potential new impacts are determined through the process mandated by CEQA, in which the Certified EIR is used as the baseline for comparative analysis, except in the case of changed circumstances or new information, where existing conditions are used as the baseline.

Section 4.0, *Environmental Analysis*, evaluates those subject areas for which changes in the proposed Project, changes in circumstances, or new information result in potentially greater impacts than those identified in the Certified EIR. Subject areas addressed in this Section include:

- Land Use and Planning
- Transportation
- Air Quality
- Greenhouse Gas Emissions
- Wildfire

Subject areas that were determined to produce no new impacts are discussed in Section 5.0¸ *Subject Areas Not Discussed in Detail,* and include the following:

- Aesthetics, Light and Glare
- Agricultural Resources
- Biological Resources
- Cultural Resources
- Geology and Soils
- Hazardous Materials
- Mineral Resources
- Noise
- Population, Housing, and Employment
- Public Resources
- Recreational Facilities
- Tribal Cultural Resources
- Water Supply
- Wastewater
- Solid Waste
- Electricity and Natural Gas
- Hydrology, Drainage, and Water Quality
- Energy

NOTICE OF PREPARATION

Pursuant to the provision of *CEQA Guidelines* Section 15082, as amended, the City of Murrieta circulated a Notice of Preparation (NOP) to public agencies, special districts and members of the public who had requested such notice for a 30-day period, beginning February 14, 2019 and ending March 22, 2019. The purpose of the NOP was to formally announce that the City is preparing an SEIR for the proposed project, and that as Lead Agency, was soliciting input regarding the scope and content of the environmental information to be included in the SEIR. An Initial Study Checklist was not circulated with the NOP. The NOP is provided in Appendix A.

NOP AND SCOPING RESULTS

The City of Murrieta received NOP comments from the following individuals, groups, and agencies:

- Diversified Pacific Communities
- Endangered Habitats League
- Metropolitan Water District of Southern California
- Native American Heritage Commission
- Riverside County Airport Land Use Commission
- Riverside County Department of Waste Resources
- South Coast Air Quality Management District
- Joshlynn Russell – Resident

The specific environmental concerns outlined below in *Table 2-2*, *NOP Comments* were raised in the responses to the NOP. The table briefly summarizes the comment(s) and the relevant SEIR section where the topic is addressed. All NOP comment letters are provided in Appendix B.

Table 2.2
NOP Comments

Individual, Group or Agency	Comment	EIR Section[1]	General Plan Update[2]
Diversified Pacific Communities	Explain and provide the description of the Innovation use being proposed for Planning Area 1 – and detail the uses allowed within the designation.	Section 3, Project Description Section 4.1 Land Use	X
Endangered Habitats League	Alternatives should include a land use scenario that identifies and increases density in "town centers." Such locations should have enhanced walkability and transit adaptability compared to the automobile centric pattern of growth that it otherwise prevalent in Murrieta.	Section 3, Project Description Section 4.1 Land Use	
	The update should improve the regional jobs-housing imbalance with more employment-generating uses.	Section 3, Project Description Section 4.1 Land Use Section 4.2, Transportation	
	Analyze how the City's growth would affect the provision of water and sewer services, change traffic patterns and safety, Police and Fire response times, pedestrian and trail safety, air quality impacts, and the provision of public open space versus private property rights in the Los Alamos Hills area.	Section 3, Project Description Section 4.1 Land Use Section 4.2 Transportation Section 4.3 Air Quality Section 5, Issues Areas Not Discussed	

Individual, Group or Agency	Comment	EIR Section[1]	General Plan Update[2]
	Reflecting its participation in the Western Riverside County Multiple Species Habitat Conservation Program (MSHCP) which reconciles biological and economic objectives on a regional basis, MSHCP compliance should - if not already – *be incorporated into the General Plan* as a mitigation measure for all new development (residential, commercial, industrial, public and private infrastructure). Parenthetically, we note that the residents of Murrieta have been chief beneficiaries of nearby MSHCP financial investments, such as Winchester 700 and Warm Springs Ranch.		X
	A revised CAP should focus on the land use and transportation sectors, with reduction of vehicle miles traveled (VMT) as the primary consideration. The California Air Resources Board (CARB) has definitively identified the State's increasing VMT as the greatest obstacle to meeting its greenhouse gas reduction objectives, yet this sector is under local rather than state control. The town center and jobs-housing approaches described above can help, as could a shuttle bus system. In addition, the City should create a program to "retire" the existing development rights for high-VMT housing units that are already approved and which have a high likelihood of actually being constructed. The "avoided conversion" methodology that CARB has developed for agriculture lands should be adapted by the City for this purpose, so as to create carbon credits on lands slated for VMT retirement. These credits would be purchased as GHG mitigation by other development. Retired VMTs could also originate in the unincorporated area. Lands that would contribute to MSHCP assembly should be prioritized, in order to achieve that important co-benefit.	Section 3, Project Description Section 4.1 Land Use Section 4.2 Transportation	
Metropolitan Water District of Southern California (Metropolitan)	Metropolitan is concerned with potential impacts to their 2 pipelines and right-of-way as a result of the implementation of the General Plan Update (Metropolitan's San Diego Pipeline 1 is an approximately 54-inch inside diameter pipeline, and their San Diego Pipeline 2 is an approximately 60-inch diameter pipeline, both of which traverse the project boundary within the City's Sphere of Influence).	Section 5, Issues Areas Not Discussed	
	In order to avoid potential conflicts with Metropolitan's rights-of-way Metropolitan may require that any design plan for any activity in the area of Metropolitan's pipelines or facilities be submitted to the attention of Metropolitan's Substructures Team to assist the City of Murrieta in preparing plans that are compatible with Metropolitan's facilities and rights-of-way.	Section 5, Issues Areas Not Discussed	
Native American Heritage Commission (NAHC)	The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of the proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources.	Section 5, Issues Areas Not Discussed	X
Riverside County Airport Land Use Commission	ALUC staff has determined that the project would impact properties within Compatibility Zones B1, C, D and E of the French Valley Airport Influence Area.	Section 5, Issues Areas Not Discussed	X

Individual, Group or Agency	Comment	EIR Section[1]	General Plan Update[2]
	California Public Utilities Code section 21676 requires the local agency to refer any amendment of a general plan or specific plan, or the adoption or approval of a zoning ordinance or building regulation within an Airport Land Use Compatibility Plan (ALUCP) to the ALUC. Since the project contemplates amendment of a general plan, the ALUC requests that you submit the above-identified project(s) for its review.	Section 5, Issues Areas Not Discussed	
Riverside County Department of Waste Resources	Build-out of the Project may have the potential to increase the amount of waste that could adversely affect solid waste facilities. To assess waste impacts, the Draft SEIR should include the projected maximum amount of waste generated from build-out of the Project, using appropriate waste generation factors for the proposed General Plan update land uses.	Section 5, Issues Areas Not Discussed	
	Information related to analysis of solid waste impacts.	Section 5, Issues Areas Not Discussed	
	Recomends the consideration of incorporating measures to help reduce the Project's anticipated solid waste impacts and enhance efforts to comply with the State's mandate of 50% solid waste diversion from landscaping.	Section 5, Issues Areas Not Discussed	
	The Draft SEIR should provide a discussion about the need for the Project to comply with all regulatory requirements regarding recycling access in accordance with SB 1327, Chapter 18, California Solid Waste Reuse and Recycling Access Act of 1991/	Section 5, Issues Areas Not Discussed	
South Coast Air Quality Management District	Comments are recommendations regarding the analysis of potential air quality impacts from the Proposed Project that should be included in the Draft Supplemental Environmental Impact Report (SEIR).	Section 4.2 Transportation Section 4.3, Air Quality Section 4.4 Greenhouse Gas Emissions	
Joshlynn Russell, Murrieta Resident	Inquiry into when public comment period closed for the NOP and how to submit comments.	Notice of Preparation, Attachment A	

1 = The EIR section in which the analysis is provided.
2 = The comment is relevant for the General Plan Update

2.4 Intended Use of SEIR

The City is the Lead Agency under CEQA for this proposed Project. CEQA Guidelines Section 15367 defines the Lead Agency as "the public agency which has the principal responsibility for carrying out or approving a project." This SEIR will be used by the City, responsible agencies, and the public, for the purpose of evaluating the environmental effects associated with the proposed Project.

In addition, because the Certified EIR, which this SEIR augments, was a program EIR as defined in CEQA Guidelines Section 15168, this SEIR is intended for use by the City in streamlining environmental documentation for future development projects that could consider tiering from this document, such as development of a permitted use on individual parcels within the City.

2.5 Format of SEIR

Section 1.0, Executive Summary, provides a brief description and summary of the proposed Project's environmental impacts and mitigation measures and alternatives.

Section 2.0, Introduction and Purpose, summarizes the background of the proposed Project and explains the environmental review process.

Section 3.0, Project Description, provides a detailed description of the proposed Project. This section describes the environmental setting and defines the proposed Project.

Section 4.0, New Environmental Analysis, evaluates the impacts associated with implementation of the proposed Project. This section contains a detailed environmental analysis of the existing conditions, Project impacts, recommended mitigation measures, and unavoidable adverse impacts for a number of environmental topic areas. Mitigation measures that are incorporated into the proposed Project in the form of goals and policies are described and additional mitigation measures, which may be required to mitigate Project impacts, are recommended.

Section 5.0, Subject Areas Not Discussed in Detail, provides a brief statement of why subject areas with no new impacts did not require new environmental analysis in the SEIR.

Section 6.0, Alternatives, describes a reasonable range of alternatives to the proposed Project that could avoid or substantially lessen the significant impact of the proposed Project and still feasibly attain the basic proposed Project objectives.

Section 7.0, Other CEQA Considerations, discusses growth-inducing impacts associated with the proposed project; significant environmental changes that would be involved with the proposed project, should it be implemented.

Section 8.0, Effects Found Not To Be Significant, provides an explanation of potential impacts that have been determined not to be significant.

Section 9.0, Significant Environmental Effects Which Cannot Be Avoided if the Proposed Action is Implemented, describes those impacts that remain significant and unavoidable following mitigation.

Section 10.0, References, lists the report preparation personnel and a list of reference materials.

The following Appendices contain the technical documentation for this SEIR:

Appendix A: Notice of Preparation
Appendix B: Notice of Preparation Comments
Appendix C: Technical Memorandum: Air Quality and Greenhouse Gas Impact Analysis, August 14, 2019
Appendix D: Water Study for the Murrieta General Plan Update and Eastern Municipal Water District Potential Annex Area, June 2019
Appendix E: Traffic Impact Analysis, August 21, 2019
Appendix F: Traffic Impact Analysis: Technical Appendix
Appendix G: Memorandum: Vehicle Miles Travelled (VMT) Analysis, August 16, 2019
Appendix H: Draft Murrieta General Plan 2035
Appendix I: Draft Zone Code Amendment
Appendix J: Draft Climate Action Plan Update

3.0 Project Description

3.1 Location and Setting

As shown on Exhibit 3-1 (Regional Location Map), the City of Murrieta is located in southwestern Riverside County. The City's Planning Area is comprised of 26,852 acres (41.96 square miles) of which 21,511 acres (33.61 square miles) are located within the City limits and 5,341 acres (8.34 square miles) are located within the City's Sphere of Influence. Surrounding cities include Menifee to the north, Temecula to the south and east, Wildomar to the west, and unincorporated Riverside County to the north, south, and east. The San Diego County border is just south of Temecula, and Orange County lies on the other side of the Santa Ana Mountains to the west. Regional access to the City is provided by the Interstates 15 and 215.

3.2 Background

In 2009, the City of Murrieta initiated a comprehensive update of the General Plan which was adopted on July 19, 2011 and included a Climate Action Plan. The City's 2011 General Plan consists of the following elements: Land Use, Economic Development, Circulation, Infrastructure, Healthy Community, Conservation, Recreation and Open Space, Air Quality, Noise, Safety and Housing. In 2018, the City issued a request for proposals (RFP) to prepare a focused General Plan Update (GPU) of the City's 2011 General Plan, a CAP Update, and the preparation of the SEIR. In 2019, the City augmented the scope of work to include a focused Zone Change and Zone Code Amendment. The "proposed Project" in this SEIR includes a GPU, CAP Update, and Zone Code Amendment.

3.3 Statement of Objectives

The City of Murrieta's objectives for the proposed Project are as follows:

- Provide a focused update to the 2011 General Plan and the Zoning Code.
- Address changes in State law enacted since the adoption of the 2011 General Plan.
- Evaluate the Office Research Park designation and recommend any revisions and/or provide a new land use designation.

- Modify the organization and location of land use designations in key areas of the City.
- Update General Plan development projections to the year 2035.
- Provide a basis for informative decisions when considering development associated with implementation of the General Plan 2035 in the City of Murrieta.
- Update the City's CAP to address new State and regional goals since the adoption of the 2011 CAP and the proposed changes to land use designations in certain areas within the City as part of the GPU. Provide a legally defensible environmental foundation upon which discretionary actions may be evaluated.
- Provide an analysis in the SEIR related to the possible future annexation of an area into the Eastern Municipal Water District (EMWD) which is currently not served by a water district. No annexation into the EMWD is proposed as part of the Project; however, the SEIR will include a facilities assessment that the Riverside Local Agency Formation Commission would require as part of the information needed for a future annexation request by the City.

3.4 Project Characteristics

Major components of the proposed Project include:

- Additions, deletions, or modifications to the 2011 General Plan goals, policies, exhibits and implementation to address changes in State law enacted since the adoption of the 2011 General Plan (Appendix H).
- Update of General Plan development projections to the year 2035.
- Update of the existing General Plan 2035 Land Use Policy Map (Exhibit 3-2) in six key areas.
- Update of the Land Use Element with a new land use designation (Innovation) and a revised mix and location of land use designations in six key areas as shown on the proposed General Plan 2035 Land Use Policy Map (Exhibit 3-3).
- Revisions to the 2011 General Plan Focus Areas exhibits, text and policies.
- Creation of the new Innovation zoning district and an amendment to the City's Development Code to incorporate the new zone (Appendix I)
- Update of the existing Zoning Map (Exhibit 3-4) so that it is consistent with the proposed General Plan 2035 Land Use Policy Map as shown on the proposed Zoning Map (Exhibit 3-5).
- Update of emissions inventory, projections, targets, and GHG reduction strategies and measures for the CAP Update..

The SEIR will also include analysis related to the possible future annexation of an area identified on Exhibit 3-3 (General Plan 2035 Land Use Policy Map) into the EMWD. No

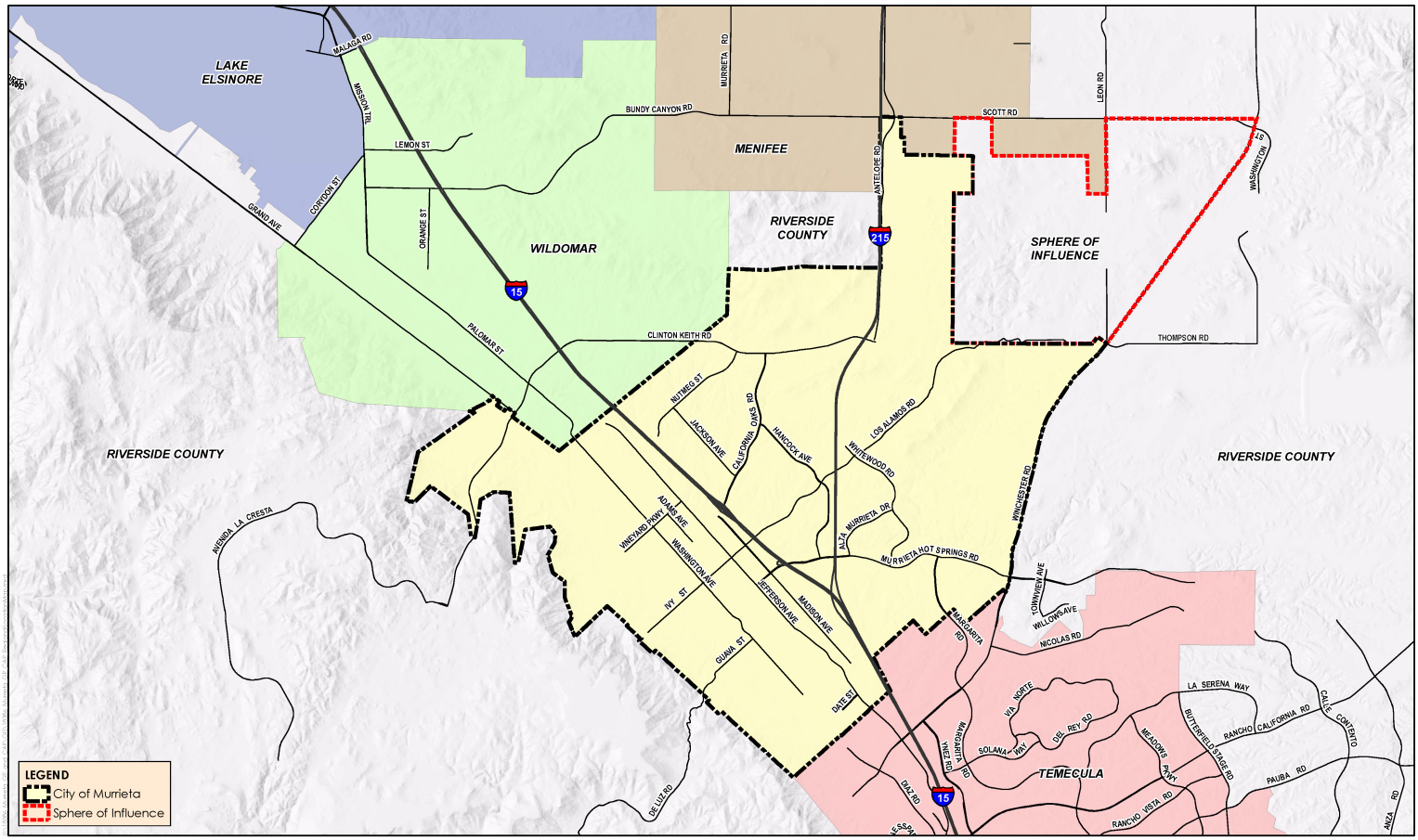
annexation into the EMWD is proposed as part of the Project; however, the SEIR will include a facilities assessment that the Riverside Local Agency Formation Commission would require as part of the information needed for a future annexation request by the City. The proposed Project will provide the City Council, Planning Commission, City Staff, and the entire community with updated plans to guide the City's decision-making and development processes through 2035.

3.4.1 Climate Action Plan

The Climate Action Plan Update (CAP Update) serves as a comprehensive roadmap of actions that the City of Murrieta will take to achieve its fair share of greenhouse gas (GHG) reductions consistent with State laws, policy, and goals, and the latest climate change science. The CAP Update has also been prepared to meet the requirements of CEQA Guidelines Section 15183.5(b) regarding plans for the reduction of GHG emissions. Doing so creates the opportunity for the City to streamline the analysis of GHG emissions during the environmental review process for future projects that implement the GPU

As mentioned above in Section 3.2, in 2011, the City of Murrieta adopted its first CAP (2011 CAP), as part of the City's 2011 General Plan Update. This 2020 CAP Update (CAP Update) was prepared concurrently with a focused update of the City's General Plan to be consistent with State legislation and guidance released since the 2011 CAP was adopted. The 2011 CAP's GHG emissions baseline inventory was for the year 2009 and established emission forecasts for 2020 and 2035 with a GHG reduction target year of 2020, which aligned with the State goals at that time. The CAP Update provides an updated baseline year of 2016, emissions forecasts for 2030, 2035, and 2050 with GHG emission targets for 2030 and 2035. The CAP Update focuses primarily on reducing emissions by 2030 and 2035, and also establishes a 2050 goal.

The proposed land use pattern of the General Plan Update is a crucial component of the City's strategy to reduce GHG emissions by locating residential units in close proximity to potential job opportunities at the employment areas in the proposed and existing Innovation, Business and Office Research Park designated areas. The proposed land use pattern creates opportunities for trips to be made by walking, bicycling, or short vehicle trips, in addition to providing economic benefits.



RICK ENGINEERING COMPANY

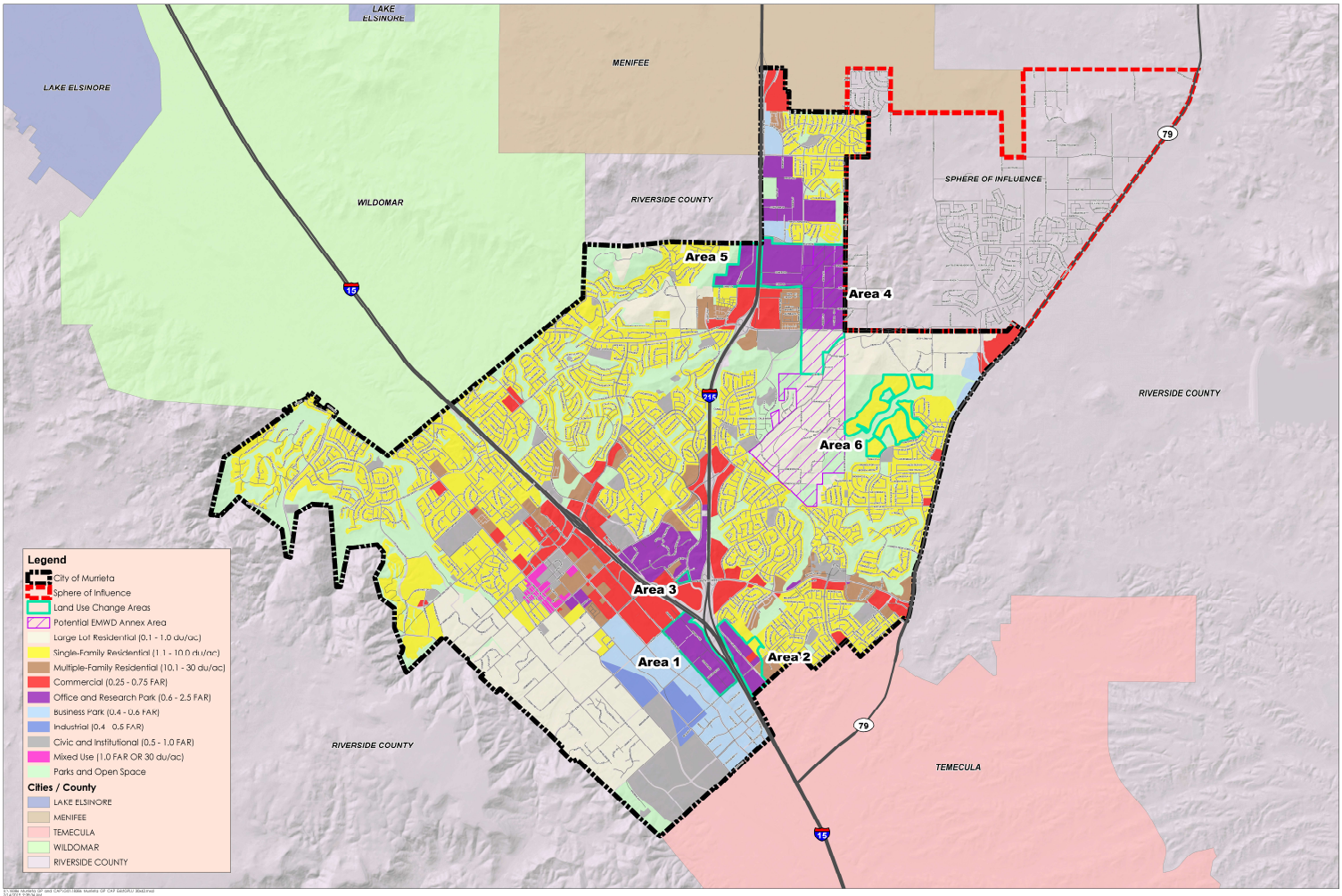
Scale in Feet: 0 6,000 12,000

North

Date of Exhibit: 1/10/2019
ESRI World Imagery & World Transportation Basemaps

Regional Location Map

Exhibit 3-1



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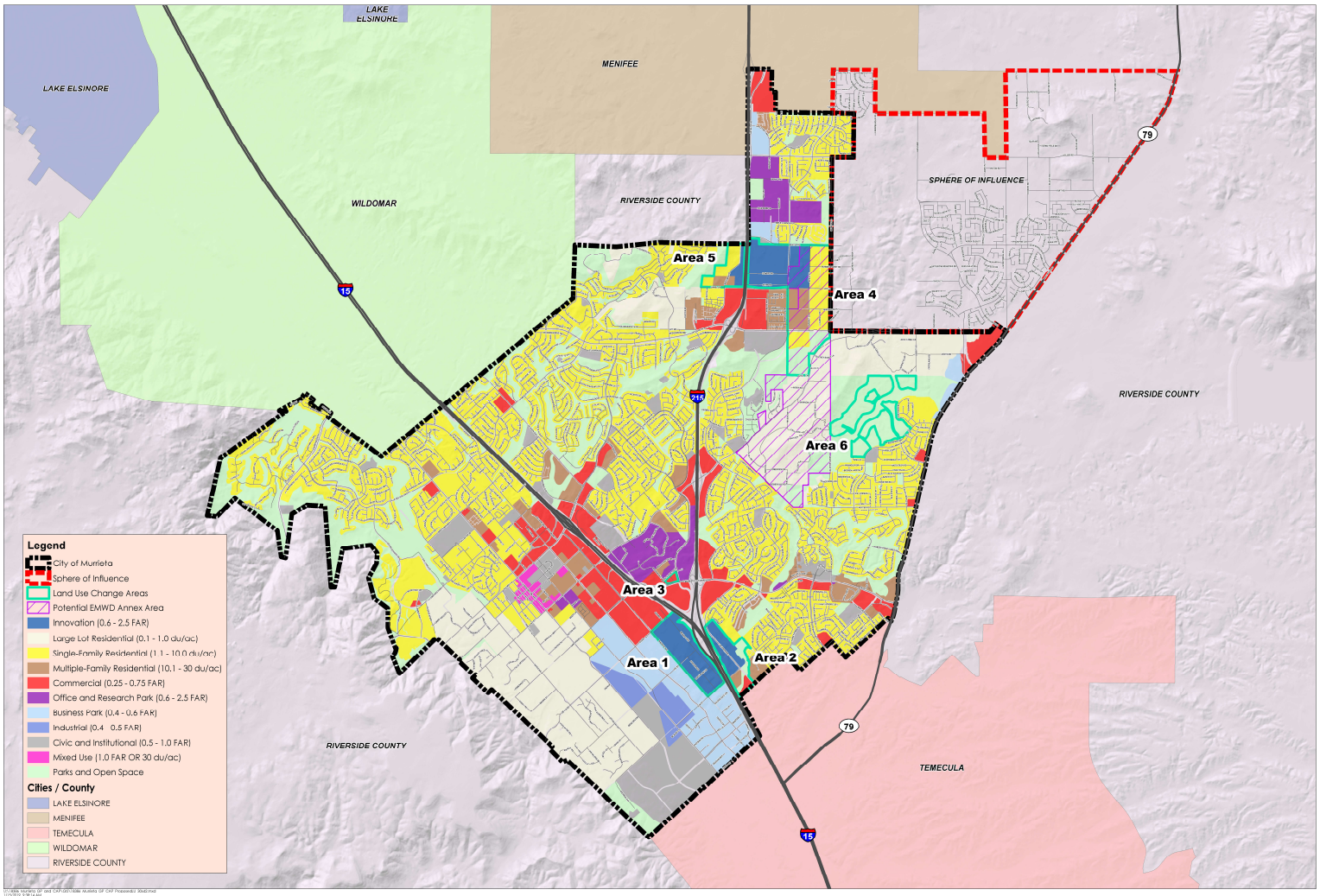
Scale in Feet
0 2,400 4,800 7,200
North

Date of Exhibit: 3/14/2019
ESRI World Imagery Basemap: 06/04/2016

Existing General Plan 2035 Land Use Policy Map

Exhibit 3-2



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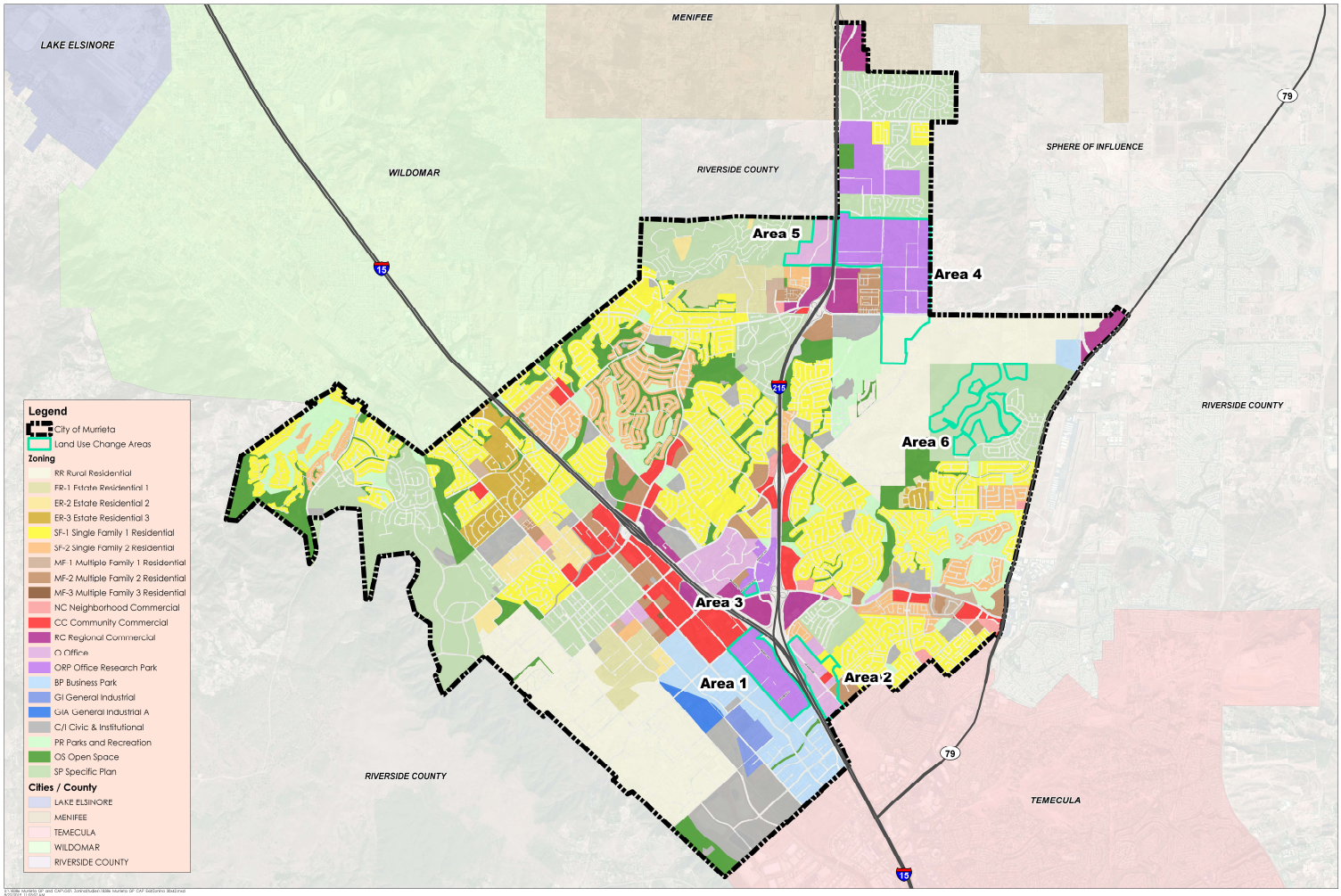
Scale in Feet

Proposed General Plan 2035 Land Use Policy Map

Exhibit 3-3



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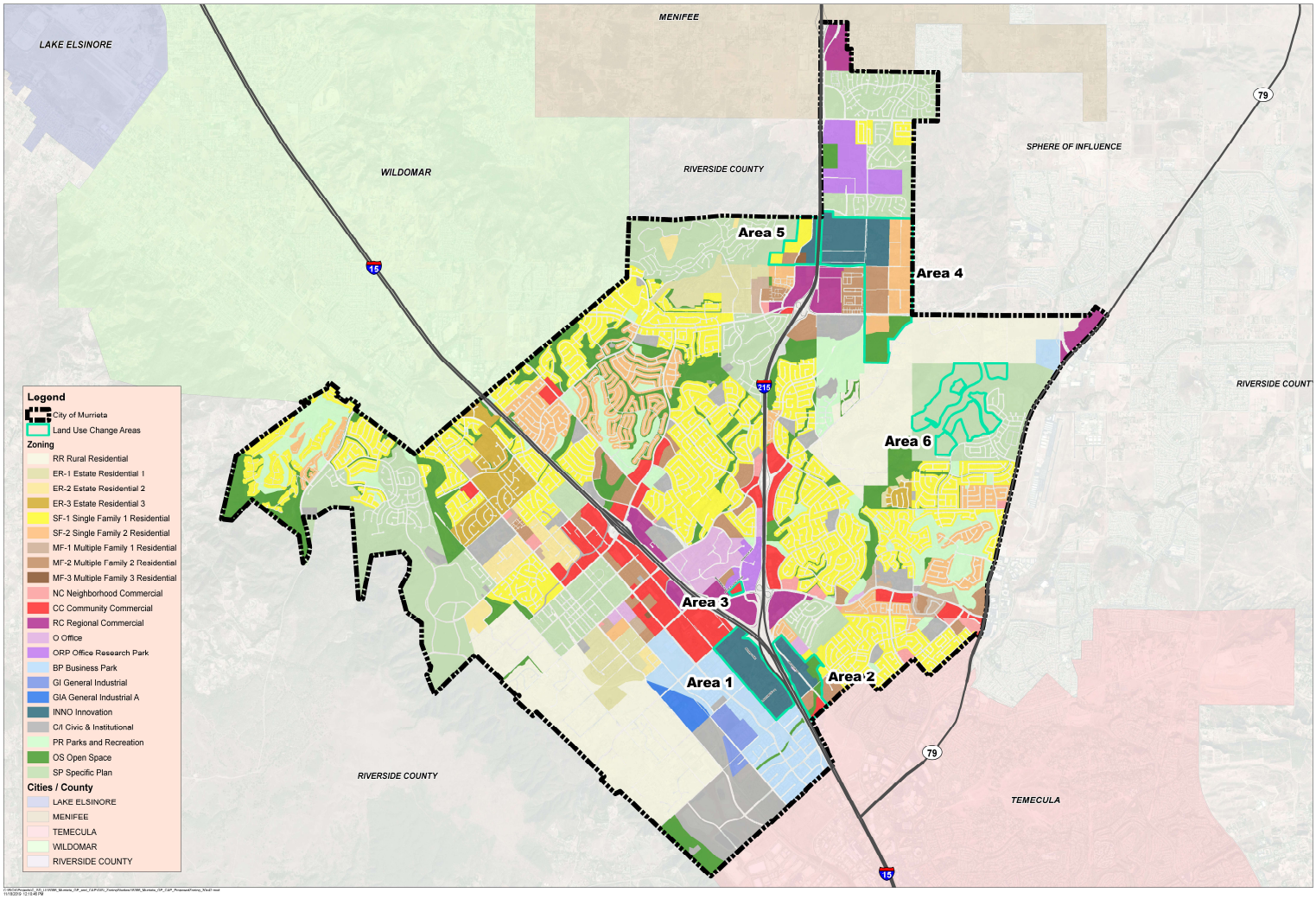
Scale in Feet: 0 1,800 3,600 5,400

North

Date of Exhibit: 8/14/2019
City of Murrieta Zoning
ESRI World Imagery Basemap: 10/18/2018

Existing Zoning Map

Exhibit 3-4



Proposed Zoning Map

Exhibit 3-5

3.5 Comparison of Proposed Project to Approved Project

3.5.1 General Plan

The proposed Project supersedes the 2011 Murrieta General Plan and subsequent General Plan Amendments through 2018. This is a focused update and, as such, many portions of the 2011 General Plan will remain unchanged. This section summarizes the major changes between the 2011 General Plan and the proposed Project as well as the new Innovation zoning district.

The existing 2011 General Plan 2035 Land Use Policy Map (Exhibit 3-2) identifies the type, location, and density/intensity of future development within the City of Murrieta. There are two key differences between the 2011 General Plan Land Use Policy Map and the proposed General Plan 2035 Land Use Policy Map (Exhibit 3-3) which are found within six key areas. The location of the six key areas are depicted on both the existing and proposed Land Use Policy Maps. The first difference is that the proposed Project contains a new land use designation, Innovation. The second difference is the mix and location of land use designations within the six key areas.

New Land Use Designation

The new land use designation, Innovation, is defined below.

> ***Innovation [.6 – 2.5 Floor Area Ratio (FAR)].*** *The Innovation designation provides for a wider variety and intensity of non-residential uses allowed elsewhere in the City with the goal of providing a cutting edge and campus-like mixed-use business setting. The Innovation designation provides for employment intensive uses such as business and medical offices, corporate headquarters, medical services, research and development, education, technological advancement, makers labs (such as people using digital tools to design new products), craftsman products (such as furniture and window design/construction), and hotels. The designation also provides for a limited amount of commercial uses for the sale of products made in facilities on-site and restaurants that support the employment and primary uses.*

Land Use Map Changes

A summary of the changes in the mix and location of land use designations within the six key areas depicted on Exhibits 3-2 and 3-3 follows below.

Area One:

Location: Bordered by Elm Street to the south, Madison Avenue to the west, Guava Street to the north, and the I-15 to the east
Existing Land Use Designations: Office Research Park
Proposed Land Use Designations: Innovation

Area Two:

Location: Bordered by a residential subdivision to the north, the City's boundary with the City of Temecula to the south, I-15 to the west, and residential subdivisions, open space areas and a creek to the east.
Existing Land Use Designations: Office Research Park, Commercial, Single-Family Residential, Multi-Family Residential
Proposed Land Use Designations: Innovation, Parks and Open Space, Commercial, Multi-family Residential

Area Three:

Location: Bordered by Murrieta Hot Springs Road to the south, Sparkman Drive to the west, Medical Center Drive to the north, and Hancock Avenue to the east.
Existing Land Use Designations: Office Research Park and Civic and Institutional
Proposed Land Use Designations: Commercial

Area Four:

Location: Bordered by Whitewood Road and I-215 to the west, Baxter Road to the north, Menifee Road to the east, and Los Alamos Road to the southeast.
Existing Land Use Designations: Office Research Park, Large Lot Residential
Proposed Land Use Designations: Innovation, Single-Family Residential, Multi-family Residential, Parks and Open Space

Area Five:

Location: Bordered by the City's boundary with the County of Riverside to the north, Open Space areas to the west, I-215 to the east, and Linnel Lane to the south.
Existing Land Use Designations: Office Research Park
Proposed Land Use Designations: Innovation, Single-Family Residential, Multi-Family Residential

Area Six:

Location: Bordered by Big Dipper Way, Via Mira Mosa, and Ariel Street to the south, Maximillian Avenue to the east, Donald Road to the north, and open space

areas to the west.
Existing Land Use Designation: Single-Family Residential
Proposed Land Use Designation: Parks and Open Space

Policy Revisions
The proposed Project also includes policy revisions to address changes in State law enacted since the adoption of the 2011 General Plan as well as subsequent amendments to exhibits, graphs, tables, maps and text. Key policy issues since the 2011 General Plan that are addressed in the proposed Project include: wildfire risks and preparation (SB 1249), climate adaptation and resiliency (SB 379); transitioning to VMT analysis from LOS for traffic (SB 743); and environmental justice (SB 1000). In addition, the Focus Areas and associated exhibits, text, and policies from the 2011 General Plan have been revised. The revised, new and/or deleted policies are listed below by General Plan element. The policy revisions will be further discussed in the SEIR (Sections 4.0).

Land Use Element - Revised and/or New Policies

LU-6.4 Establish the North Murrieta Business Corridor as a regional center for medical services and research.

LU-6.5 Actively seek private sector investment of high quality job creators that support and enhance the Loma Linda University Medical Center, Kaiser Permanente, and Rady Children's Hospital.

LU-6.6 Support the future development and expansion of the Loma Linda University Medical Center campus.

LU-6.7 Encourage the development of "flex tech" uses in the Business Park and Industrial use areas.

LU-6.8 Update the Development Code to limit commercial uses in the Business Park and Industrial Use areas.

LU-6.9 Encourage the development of a job-creating center of office, research, technology, and commercial activity to complement the regional orientation of the land use plan for the area bounded by the I-15 and I-215 freeways and Murrieta Hot Springs Road.

LU-6.10 Encourage opportunities for retail, office, and research uses to complement and serve existing uses in the North Murrieta Business Corridor Focus Area.

LU-6.11 Revitalize private and public lands in need of redevelopment or those that are underdeveloped due to lack of public facilities and revitalization.

LU-7.9	Encourage opportunities for complementary retail and service uses to serve local residents and the daytime employment population.
LU-7.10	Encourage a range of retail uses that serve local residents and the region.
LU-9.8	Ensure adequate buffers are provided between residential and non-residential uses.
LU-11.9	Ensure that the design of buildings in the North Murrieta Business Corridor help to create a distinctive and cohesive look to reinforce this Focus Area as a major gateway into the City.
LU-11.10	Ensure that the design of buildings in the South Murrieta Business Corridor help to create a distinctive and cohesive look to reinforce this Focus Area as a major gateway into the City.
LU-11.11	Ensure that uses are designed to reflect the natural topography.
LU-11.12	Ensure appropriate buffers are provided between Rural, Single-Family, and Multiple-Family Residential uses.
LU-11.13	Encourage Office and Research Park uses that are complementary to the Civic Center and the Downtown Murrieta Specific Plan.
LU-12.2	Allow for Office and Research Parks and Innovation developments of a more intense nature in terms of height than other areas of the City.
LU-13.11	Bring together the property owners in the Los Alamos Hills area to determine the land area to be included in a future Specific Plan.
LU-13.12	Bring together the property owners to develop a consensus-based Specific Plan.
LU-13.13	Encourage the Los Alamos Hills community groups, such as the Citizens for Quality of Life in Murrieta (CQLM), and property owners to work together with infrastructure providers and the City to identify infrastructure needs and costs, as well as financing options and timing for roads, road improvements, and water and sewer infrastructure, throughout the future Los Alamos Hills Specific Plan area.
LU-17.3	Encourage the location of civic, institutional, office uses, and other job-creating uses in downtown Murrieta. Supportive commercial activities and residential development should be encouraged.

LU-17.4 Encourage the development of community amenities such as libraries, museums, galleries, theaters, and other cultural activities within downtown Murrieta area.

LU-17.6 Encourage mixed-use development projects within downtown Murrieta that create a pedestrian style living environment and encourage use of mass transit.

LU-17.7 Update the Downtown Murrieta Specific Plan as necessary to enable the area to serve its functional role, and to carry forward a program of infrastructure development.

LU-18.12 Require new development in compatibility zones that is 10 acres or larger in area shall incorporate open space area in compliance with the Riverside County Airport Land Use Compatibility Plan Section 4.2.4 and in compliance with the applicable compatibility zones requirements in the French Valley Airport Land Use Compatibility Plan.

Land Use Element - Deleted Goals and/or Policies

REDEVELOPMENT

GOAL LU-12 Effective use of redevelopment as a tool for economic development and community improvement.

POLICIES

LU-12.1 Continue to prioritize commercial, industrial, and residential revitalization within the redevelopment project area.

LU-12.2 Revitalize private and public lands in need of redevelopment or those that are underdeveloped due to lack of public facilities and revitalization.

LU-12.3 Provide yearly review of the City's redevelopment program under the California Community Redevelopment Law to coordinate and pursue community improvement and revitalization activities.

LU-12.4 Ensure conditions of blight are evaluated, as needed, to ensure the Redevelopment Plan is reflective of community needs.

NORTH MURRIETA BUSINESS CORRIDOR FOCUS AREA

GOAL LU-14	The North Murrieta Business Corridor will become an employment center for high-quality medical, high technology, and research jobs.

POLICIES

LU-14.1 Establish the North Murrieta Business Corridor as a regional center for medical services and research.

LU-14.2 Support the future development and expansion of the Loma Linda University Medical Center campus.

LU-14.3 Actively seek private sector investment of high quality job creators that support and enhance the Loma Linda University Medical Center.

LU-14.4 Encourage opportunities for complementary retail and service uses to serve local residents and the daytime employment population.

LU-14.5 Provide for Office and Research Park developments of a more intense nature in the North Murrieta Business Corridor Focus Area in terms of height than other areas of the City.

LU-14.6 Ensure that the design of buildings in the North Murrieta Business Corridor help to create a distinctive and cohesive look to reinforce this Focus Area as a major gateway into the City.

Refer to related policies in the Land Use Element: Policy LU-3.2 regarding buffering residential uses from incompatible uses.

CLINTON KEITH/MITCHELL FOCUS AREA

GOAL LU-15	The Clinton Keith/Mitchell area will provide for a mix of land uses, including high-quality residential, regional-serving commercial, and job-creating uses.

POLICIES

LU-15.1 Ensure appropriate buffers are provided between Rural, Single-Family, and Multiple-Family Residential uses.

LU-15.2 Ensure adequate buffers are provided between residential and non-residential uses.

LU-15.4 Encourage opportunities for retail, office, and research uses to complement and serve the uses in the North Murrieta Business Corridor Focus Area.

LU-15.5 Encourage a range of retail uses that serve the local residents.

GOLDEN TRIANGLE NORTH (CENTRAL MURRIETA) FOCUS AREA

GOAL LU-16 The Golden Triangle North (Central Murrieta) area will become a local and regional generator of commerce.

POLICIES

LU-16.1 Encourage the development of a job-creating center of office, research, technology, and commercial activity to complement the regional orientation of the land use plan for the area bounded by the I-15 and I-215 freeways and Murrieta Hot Springs Road.

LU-16.2 Provide for Office and Research Park developments of a more intense nature in the Golden Triangle North (Central Murrieta) Focus Area in terms of height than other areas of the City.

SOUTH MURRIETA BUSINESS CORRIDOR FOCUS AREA

GOAL LU-17 The South Murrieta Business Corridor will become a center of commerce that provides a complementary mix of high-quality business park, industrial, and office development.

POLICIES

LU-17.1 Encourage the expansion of a job-creating center of office, research, technology, business park, and industrial activity within the area generally bounded by the I-15 freeway on the east, Cherry Street on the south, Washington Avenue on the west, and Brown Street on the north.

LU-17.2 Encourage the development of “flex tech” uses in the Business Park and Industrial use areas.

LU-17.3 Provide for Office and Research Park developments of a more intense nature in the South Murrieta Business Corridor Focus Area in terms of height than other areas of the City.

LU-17.4 Ensure that the design of buildings in the South Murrieta Business Corridor help to create a distinctive and cohesive look to reinforce this Focus Area as a major gateway into the City.

LU-17.5 Update the Development Code to limit commercial uses in the Business Park and Industrial Use areas.

MULTIPLE USE 3 (MU-3) AREA FOCUS AREA

GOAL LU-18 A mix of residential, retail, and job-creating uses.

POLICIES

LU-18.1 Ensure appropriate buffers are provided between Rural, Single-Family, and Multiple-Family Residential uses both within and adjacent to the Multiple Use 3 Area Focus Area.

LU-18.2 Ensure adequate buffers are provided between residential and non-residential uses both within and adjacent to the Multiple Use 3 Area Focus Area.

LU-18.3 Encourage a range of retail uses that serve local residents and the region.

LU-18.4 Encourage Office and Research Park uses that are complementary to the Civic Center and the Historic Downtown Specific Plan.

LOS ALAMOS HILLS FOCUS AREA

Future Specific Plan for Los Alamos Hills Area

GOAL LU-19 Preparation of a Specific Plan for the Los Alamos Hills area.

POLICIES

LU-19.1 Bring together the property owners in the Los Alamos Hills area to determine the land area to be included in a future Specific Plan.

LU-19.2 Bring together the property owners to develop a consensus-based Specific Plan.

LU-19.3 Encourage the Los Alamos Hills community groups, such as the Citizens for Quality of Life in Murrieta (CQLM), and property owners to work together with infrastructure providers and the City to identify infrastructure

needs and costs, as well as financing options and timing for roads, road improvements, and water and sewer infrastructure, throughout the future Los Alamos Hills Specific Plan area.

Economic Development Element – Revised, New, and/or Deleted Goals and Policies

None

Circulation Element – Revised and/or New Policies

CIR-3.5 Continue to utilize the Neighborhood Traffic Management Program to provide all residential, commercial, and industrial properties sufficient and safe access for every vehicle.

CIR-3.6 Use cool pavement technology and reduce amount of paved surfaces when designing new roads, sidewalks, parking areas, and bikeways. CIR-6.15 Utilize vehicle miles traveled (VMT) as the performance measure to be used for CEQA transportation analyses conducted in the City in order to be consistent with SB 743. VMT will be the performance measure for both land development and transportation projects as of July 1, 2020.

CIR-7.9 Identify and map cooling centers in locations accessible to vulnerable populations and establish standardized temperature triggers for when they will be opened. Educate residents on heat-related risk and strategies to prevent heat-related illness.

Circulation Element – Deleted Goals and/or Policies

None

Infrastructure Element – Revised and/or New Policies

INF-1.23 Utilize, where appropriate, public financing mechanisms, such as special assessment or community facilities districts to improve existing infrastructure or to install infrastructure in needed areas/or areas to stimulate development.

INF-3.4 Bolster and/or upgrade existing transportation facilities and infrastructure that the City maintains that are determined to be vulnerable to extreme

weather to make them more resilient to periods of extreme weather events.

Infrastructure Element – Deleted Goals and/or Policies

INF-1.24 Consider the use of redevelopment financing, where appropriate, to provide infrastructure in areas where the City wishes to stimulate development.

Healthy Community Element – Revised and/or New Policies

HC-2.7 Educate decision makers and the public on the principles of environmental justice.

HC-2.8 Continually monitor those areas of the City most vulnerable to pollution and environmental hazards through CalEnviroScreen or other tool(s) recommended by the State.

HC-2.9 Consider environmental justice issues and potential health impacts associated with land use decisions, including enforcement actions to reduce the adverse health effects of hazardous materials, industrial activity and other undesirable land uses, on residents regardless of age, culture, ethnicity, gender, race, socioeconomic status, or geographic location.

HC-2.10 Consider environmental justice issues to ensure an equitable provision of desirable recreational facilities, public spaces, and other public amenities throughout the City.

HC-2.11 Utilize a variety of communication techniques and social media tools to convey environmental justice issues and information to the public.

HC-2.12 Inform potentially affected low-income and minority populations when new commercial and industrial developments are proposed with the potential for new sources of pollution.

HC-2.13 Provide the opportunity for affected residents of new developments to participate in decisions that impact their health.

HC-2.14 Provide translation and interpretation services at public meetings on land use and environmental issues affecting populations whose primary language is not English, as needed. Translation time for non-English

speakers shall be included and applied per Government Code Section 54954.3, or other applicable State laws.

Healthy Community Element – Deleted Goals and/or Policies

None

Conservation Element – Revised and/or New Policies

CSV-2.6 Continue to participate in the Home Energy Opportunity (HERO) Program, which helps homeowners reduce energy bills and decrease water consumption through special financing options.

CSV-2.7 Provide information to residents on water consumption rebates and water conservation-related education provided by the various water districts serving the City.

CSV-9.10 Promote and expand the use of drought-tolerant green infrastructure, including street trees, and landscaped areas as part of cooling strategies in public and private spaces.

CSV-11.1 Promote the protection and preservation of archaeological, cultural, historical, and architecturally significant sites, structures, districts, Native American resources, and natural features throughout the community, consistent with the Cultural Resource Preservation Ordinance, SB 18 and AB 52. Preferred methods of protection include avoidance of impacts, placing resources in designated open space and allocation of local resources and/or tax credits as feasible.

CSV-12.9 Support the U.S. Department of Energy Weatherization Assistance Program grant recipients' weatherization services and pursue California Weatherization Assistance Program grants and/or other funding sources that can help to provide weatherization services for local residents.

CSV-12.10 Support incentive programs including, but not limited to permit streamlining, permit fee reductions, or tax rebates to encourage the use of green roofs in residential and commercial buildings and/or the installation of solar photovoltaic (PV) carports in existing and future parking lots.

CSV-12.11 Implement, and amend as necessary, a Climate Action Plan.

CSV-13.1 Comply with the State's landfill diversion requirements.

Conservation Element – Deleted Goals and/or Policies

None

Recreation and Open Space Element – Revised and/or New Policies

ROS-2.3 Ensure that recreation facilities provide access and accommodations for users with a range of developmental, cognitive, and physical abilities.

ROS-6.1 Expand recreation programs for youth and teens, including before- and after-school care, sports and fitness, outdoor activity and excursions, camps, and arts education.

ROS-6.5 Continue providing the Youth Advisory Committee for high school students.

Recreation and Open Space Element – Deleted Goals and/or Policies

None

Air Quality Element – Revised and/or New Policies

AQ-1.4 Cooperate with the State and Southern California Association of Governments (SCAG) in the implementation of SB 375 – Regional Transportation Planning, Housing, CEQA and GHG Reduction Strategies.

AQ-2.6 Reduce and mitigate the potential impacts of adjacent incompatible land uses, where feasible, using buffers and other design techniques.

AQ-2.7 Encourage the planting of rows of fine-needle conifer trees along segments of freeways located in sensitive land use areas within 500 feet of I-215 and I-15. The trees shall be located on the side of the freeway that is between the receptors and the freeway segment. Specific tree species and site design parameters shall be evaluated at the time of development application to determine the most effective barriers for limiting toxic air contaminant exposure.

AQ-2.8 New buildings with indoor conditioned space located within 500 feet of I-215 and I-15 shall be equipped with particle filtration systems and devices, specifically high-efficiency filtration with mechanical ventilation or portable high efficiency air cleaners, to reduce indoor pollution concentrations as determined by a specialist certified by the American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE). An ongoing maintenance plan for the air filtration system shall be required.

AQ-2.9 Utilize adequate buffering and other land use practices to facilitate the compatibility between industrial and non-industrial uses.

AQ-2.10 New land uses that have the potential to generate stationary source emissions shall be required to obtain a permit from the South Coast Air Quality Management District.

AQ-6.7 During the design review process, encourage the use of measures to reduce indoor air quality impacts (i.e., air filtration systems, kitchen range top exhaust fans, and low-VOC paint and carpet for new developments near busy roadways with significant volumes of heavy truck traffic).

Air Quality Element – Deleted Goals and/or Policies

None

Noise Element – Revised and/or New Policies

N-2.7 Require that new mixed-use developments be designed to limit potential noise from loading areas, refuse collection, and other noise generating activities typically associated with commercial activity through strategic placement of these sources to minimize noise levels on-site.

N-2.9 Orient residential units within mixed-use developments, where possible, away from major noise sources.

N-2.10 Locate balconies and operable windows of residential units within mixed-use developments away from the primary street and other major noise sources, where possible, or provide appropriate mitigation.

N-4.4 Encourage the City to purchase and use municipal vehicles or noise-generating mechanical equipment that complies with noise standards specified in the City's Municipal Code, or other applicable codes.

Noise Element – Deleted Goals and/or Policies

None

Safety Element– Revised and/or New Policies

SAF-1.2 Coordinate emergency responses and planning for hazards with agencies at the County, regional, state, and federal levels.

SAF-3.5 Develop and maintain floodplain inundation evacuation plans in cooperation with the Riverside County Flood Control and Water Conservation District and MFR.

SAF-3.6 Maintain an active swift water rescue program and response in MFR.

SAF-3.7 The City shall continue to participate in the National Flood Insurance Program's (NFIP) Community Rating System (CRS) which provides a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed minimum NFIP requirements.

SAF-3.8 The City will continue to update and implement the City's local Hazard Mitigation Plan and Climate Action Plan.

SAF-3.9 The City will improve flood warning and information dissemination and develop robust multi-lingual educational and outreach materials accessible across multiple media forms (e.g., radio, text messaging) to publicize the potential flood risk day-to-day, emergency supplies, pet protection, key terminology, electrical safety, and evacuation routes in the case of flooding.

SAF-4.2 Develop dam failure evacuation plans in cooperation with the Riverside County Flood Control and Water Conservation District and MFR.

SAF-5.2 Provide public safety education programs through MFR to reduce accidents, injuries and fires, as well as to train members of the public to respond to emergencies.

SAF-5.3 Continue to coordinate emergency services with Riverside County, CAL FIRE, and all other agencies and districts with fire protection powers through automatic and mutual aid agreements.

SAF-5.4 Ensure that outlying areas in the City can be adequately served by the fire communication systems as new development occurs.

SAF-5.5 Require that all dedicated open space or undeveloped areas meet specifications for wildland fire safety.

SAF-5.6 Require that all structures and facilities in the City adhere to City, State and National regulatory standards such as the International Building and Fire Codes and other applicable fire safety standards.

SAF-5.7 Involve MFR in the early design stage of all projects requiring review to ensure MFR input and appropriate modifications and fire safe design is incorporated in future development.

GOAL SAF-6 Murrieta Fire & Rescue provides a timely response to fire and other emergencies.

POLICIES

SAF-6.1 Provide a total response time within the city of 6:04 minutes for medical emergencies and an effective response force (all resources dispatched to arrive at scene) for fire incidents of 10:24 minutes as measured by NFPA 1710 Standards and the Community Risk Assessment - Standards of Cover.

SAF-6.2 Ensure that each Paramedic Engine Company provides the capability to treat moderate or greater injuries, advance a hose line for fire control, and to effect a rescue of trapped occupants among other emergency operation tasks.

SAF-6.3 Provide adequate levels of emergency response personnel for all areas of the City.

SAF-6.4 Ensure sufficient personnel and appropriate apparatus to provide emergency operations and fire suppression for mid and high rise buildings and large warehouses pursuant to the Community Risk Assessment - Standards of Cover.

SAF-6.5 Locate, staff, and equip MFR apparatus to provide service to all areas within the City within a maximum of 10:24 minutes total response time for 90 percent of all large scale emergency incidents which include structure fires, mass casualty, hazardous materials or natural or man-made disasters.

SAF-6.6 Continue to incorporate Emergency Medical Dispatch into the dispatching system to provide emergency medical assistance to callers.

SAF-6.7 Strategically cross-train MFR personnel in special operations including Urban Search and Rescue, swift water rescue, and hazardous materials decontamination, wildland fire and disaster management.

SAF-6.8 Maintain and monitor a MFR Strategic Plan to address staffing and facility needs, service goals, deployment strategies, and other department goals.

SAF-6.9 Strive to achieve an Insurance Services Office (ISO) Public Protection Classification of 3 in areas with fire hydrants and 9 in areas that are not connected to an existing water district distribution system.

SAF-6.10 Review the adequacy and accessibility of the fire protection infrastructure annually relative to growth and development.

SAF-6.11 Coordinate with CAL FIRE, California's Office of Emergency Services and other local fire districts to identify strategies that ensure the capacity and resilience of escape routes potentially compromised by wildfire, including emergency evacuation and supply transportation routes.

SAF-6.12 Monitor and evaluate evacuation routes when new roads are constructed, improved or connected through the region in coordination with other agencies, such as adjacent cities and WRCOG.

SAF-6.13 Expedite reviews for building permits for the reconstruction of fire damaged structures.

SAF-7.1 Continue to require development in very high fire hazard areas to use fire-resistant building materials and landscaping, and to meet the required codes, standards and specifications for fuel modification, access, and water facilities.

SAF-7.2 Require all new development to be located in or adjacent to wildland areas to assess its vulnerability to fire and its potential as a source of fire through a Fire Protection Plan analysis.

SAF-7.4 Promote community education about preventing wildfire ignition, using fire-resistant building features, creating defensible space around homes, evacuation routes, and legal brush clearance requirements.

SAF-7.5 Continue to implement a proactive vegetation management program to reduce fire hazards on private properties.

SAF-7.6 MFR will consider different forms of mitigation for new residential development in Very High Fire Zones to minimize potential fire hazards.

SAF-7.7 Locate essential public facilities outside Very High Fire Zones when feasible with consideration that the local surrounding cities are also growing and development may fill in between and essential public facilities may be necessary in these areas.

SAF-7.8 Update General Plan Exhibit 12-8, Very High Fire Hazard Severity Zones, to maintain consistency with CAL FIRE's recommendations.

SAF-8.10 Ensure that all MFR personnel are trained and ready to operate at the level of Hazardous Materials First Responder.

SAF-8.12 Ensure that MFR personnel receiving training to achieve the Hazardous Materials Technician level.

SAF-12.2 Support a safe, secure, and technologically advanced Emergency Operations Center (EOC) to coordinate the City's response to disasters, and maintain training of City personnel in the operations of the EOC.

SAF-12.6 Participate in regularly scheduled disaster exercises to better prepare Police, Fire, Public Works and other City employees with disaster responsibilities.

Safety Element – Deleted Goals and/or Policies

None

Housing Element – Revised Goals and/or Policies

Action 1.1 – General Plan Review

The City of Murrieta recognizes that the General Plan and City's Development Code are crucial tools that guide development in the City. These tools can also create barriers if they are not reviewed and updated to reflect the needs of the community. To address and prevent development barriers the City will periodically review the Land Use Element of the General Plan, as well as the Development Code and Subdivision Ordinances, to ensure that housing opportunities for all income groups are provided. In 2011 the City Council adopted the General Plan 2035 and in late 2012 the City was in the process of updating the Zoning Code to be consistent with the changes made to the General Plan. To simplify the General Plan, the number of land use designations was reduced to allow for more flexibility in new development. Within the Zoning Code update process any barriers to affordable housing that are identified, where appropriate, will be removed. Once the Zoning Code is updated for consistency with the General Plan, the City will review the Zoning Code on a biannual basis, periodically correcting inconsistencies that may exist.

- *Responsible Agency: Murrieta Planning Division*
- *Timeframe: Ongoing, 2014-2021*
- *Potential Funding Source: General Fund*
- *Objective: Periodically review the Zoning Code for inconsistencies and standards that may prevent the development of affordable housing.*

Action 1.5 - Lot Consolidation Program

Parcels located in downtown Murrieta as well as the Downtown Murrieta Specific Plan area and the TOD Overlay Program area tend to be smaller and in some cases, narrow and/or shallow in size, adding an additional constraint to the development of housing. In order to encourage the development of residential and mixed-use projects, the City offers incentives such as a reduction in development standards (i.e. lot size, parking, and open space requirements) to encourage and facilitate consolidation of adjacent parcels to allow for a larger cohesive development. The City, with assistance from Riverside County, may also offer to subsidize a portion of development fees to encourage lot consolidation and to promote more intense residential and mixed use development on vacant and underutilized sites within the downtown Murrieta region.

- *Responsible Agency: Murrieta Housing Authority and Planning Division*
- *Timeframe: Ongoing, as projects are submitted to the Murrieta Planning Division*
- *Potential Funding Source: General Fund*
- *Objectives: The City will continue to promote the program at City Hall, on its website and will evaluate requests for modifications on a case by case basis*

Action 2.1 –Property Maintenance Enforcement

Enforce and expand where necessary, the property maintenance provisions embodied in the Uniform Building Code and the Development Code in order to conserve and improve the quality of the housing units in the City. The City's housing stock is generally in good condition as majority of the units were constructed during or after the 1980's. Consequently, potential code violations are identified by complaints reported to the City and are addressed by the City's police department and when appropriate Community Development staff. These efforts are intended to result in the continued maintenance of housing units throughout the City. If a property requires significant repairs or maintenance, code enforcement officials will inform property owners of any rehabilitation loans or grants provided through Riverside County that are be available to address such issues.

- *Responsible Agency: Development Services and Code Enforcement*
- *Timeframe: Ongoing, 2014-2021*
- *Potential Funding Source: General Fund*
- *Objective: Maintain the quality of the existing housing stock by addressing code violations as they are reported. Refer eligible property owners to Riverside County programs if property maintenance funding is needed.*

Action 4.3– Homeless Assistance Program

The City co-founded the Regional Homeless Alliance, a five-city collaborative that connects local governments, enforcement agencies, and nonprofit organizations. Through this collaboration, hundreds of homeless individuals and families have found resources to remain housed. The mission of the program is to further improve the quality of life by developing residents', businesses' and visitors' awareness, understanding, and participation in a comprehensive strategy to solve homelessness in Southwest Riverside County. This will be accomplished through outreach, housing navigation, encampment cleanups, and implementing a GIS mapping platform. Currently the City assists numerous local nonprofit organizations through the Riverside County CDBG program, including: Community Food Pantry of Murrieta, Boys and Girls Club of SW Riverside County, Michelle's Place, Safe Alternatives for Everyone (S.A.F.E.), Rose Again Foundation (foster youth), and the Assistance League of Temecula Valley. The City will continue to assist local organizations in applying for CDBG funding and other sources of funding (e.g., Homeless Emergency Aid Program) through the County, allowing them to provide irreplaceable services to extremely low-income families in the community.

- *Responsible Agency: Community Services Department and Police Department*
- *Timeframe: Ongoing 2014-2021*
- *Potential Funding Source: Riverside County CDBG and other potential sources of funding (e.g., HEAP)*
- *Objective: Monitor the number of homeless individuals in the City and provide referrals to the appropriate organizations. Also provide information about tenant and landlord housing rights at City Hall, on the City's website and in other public places to increase awareness.*

Action 5.2 – Provide Emergency and Transitional Housing

Extremely low-income households and households with special needs have limited housing options in Murrieta. Housing types appropriate for these groups include: emergency shelters, transitional housing, supportive housing, and single-room occupancy (SRO) units. To accommodate this population group the City amended the Development Code to define transitional and supportive housing as residential use, and considered subject only to those restrictions that apply to other residential uses in that same zone. The City also revised the Zoning Code to permit emergency shelters by right without a Conditional Use Permit or other discretionary action in the Business Park (BP) zone and will ensure that a proposed shelter is subject to only the development standards as permitted by State law. These zones are appropriate to accommodate emergency shelters as they are typically located along major arterial roadways with access to employment centers and near stores and other services. There are currently 376 acres of vacant land zoned BP, including sites between 2 and 5 acres, in size that

are appropriate and able to accommodate a shelter of approximately 20 beds if one is proposed. It is estimated that there are approximately 17 sites zoned Business Park between 2 and 5 acres in size, which is more than sufficient to accommodate at least one emergency shelter.

The City will continue to monitor the inventory of sites appropriate to accommodate emergency and transitional housing and will work with the appropriate organizations to ensure the needs of homeless and extremely low income residents are met. The City is committed to prioritizing funding and other available incentives for projects that provide housing for extremely low income residents whenever possible. Additionally, as mentioned in Action 4.3, the City also partners with homeless assistance service providers and will continue to do so throughout the planning period.

- *Responsible Agency: Murrieta Planning Division*
- *Timeframe: Ongoing, 2014-2021*
- *Potential Funding Source: General Fund*
- *Objectives: Ensure that the housing need of all residents is met by providing opportunities for transitional housing, emergency shelters and SRO units to be accommodated within the City. Prioritize available incentives for extremely low income households.*

Growth Assumptions

Table 3-1 below depicts the growth assumptions for the 2011 General Plan based on existing 2018 land use designation acreages. In total, the existing General Plan based on existing 2018 land use designation acres, anticipates 44,351 residential dwelling units and 48,764,774 square feet of non-residential uses.

Table 3-1
2011 General Plan 2035 Land Use Summary[1]

Land Use Designation	Acres	Density Standard (du/ac)	Intensity Standard (FAR)	2035 Estimated Buildout	
				DU	SF
Large Lot Residential	3,030.62	0.4 - 1.0		939	
Single-Family Residential	6,255.31	1.1 - 10.0		30,338	
Multiple-Family Residential	661.56	10.1 – 30.0		12,318	
Commercial	1,266.58		0.25 – 0.75	4	17,655,112
Office and Research Park	1,353.70		0.6 -2.5	20	15,921,136
Business Park	717.35		0.4 – 0.6		9,999,285
Industrial	185.47		0.4 – 0.5		2,585,303
Civic and Institutional	1,064.88		0.5 – 1.0		1,391,585
Parks and Open Space	3,474.46				16,508
Mixed Use	59.68	30	1	731	1,195,844
Roads	3,441.07				
TOTAL CITY ONLY	**21,510.68**			**44,351**	**48,764,774**
Sphere of Influence	5,340.95				
TOTAL WITH SPHERE OF INFLUENCE	**26,851.63**				

Notes:
1. This table summarizes the projected buildout of the 2011 General Plan based on existing 2018 land use designations by acre.
2. du/ac = dwelling units per acre
3. FAR = Floor Area Ratio

Table 3-2 below depicts the proposed Project's's revised growth assumptions. In total, the proposed Project anticipates 45,923 residential dwelling units and 46,359,173 square feet of non-residential uses. As depicted in Table 3-2, a new land use designation (Innovation) is being incorporated into the proposed Project.

Table 3-2
Proposed General Plan 2035 Land Use Summary

Land Use Designation	Acres	Density Standard (du/ac)	Intensity Standard (FAR)	2035 Estimated Buildout	
				DU	SF
Large Lot Residential	2,927.44	0.4 - 1.0		908	
Single-Family Residential	6,215.73	1.1 - 10.0		30,146	
Multiple-Family Residential	758.03	10.1 – 30.0		14,115	
Innovation	520.79		0.6 - 2.5		7,259,396
Commercial	1,279.26		0.25 – 0.75	4	17,831,861
Office and Research Park	516.91		0.6 -2.5	20	6,079,482
Business Park	717.35		0.4 – 0.6		9,999,285
Industrial	185.47		0.4 – 0.5		2,585,303
Civic and Institutional	1,064.81		0.5 – 1.0		1,391,494
Parks and Open Space	3,824.14				16,508
Mixed Use	59.68	30	1	731	1,195,844
Roads	3,441.07				
TOTAL CITY ONLY	**21,510.68**			**45,923**	**46,359,173**
Sphere of Influence	5,340.95				
TOTAL WITH SPHERE OF INFLUENCE	**26,851.63**				

Notes:
This table summarizes the proposed draft General Plan buildout. Buildout calculations described in this table are estimates.

The proposed Project's anticipated change in dwelling units and non-residential square feet over the 2035 estimated buildout from the 2011 General Plan[1] is:

- Addition of 1,572 dwelling units
- Reduction of 2,405,601 square feet of non-residential uses

[1] Includes 2018 land use designation acreages.

3.5.2 Zoning

The proposed Project includes the new Innovation zoning district to ensure consistency with the proposed Project's Innovation Land Use Designation. In addition, the zoning map has also been updated to ensure consistency with the changes in the proposed Project's Land Use Policy Map.

There are two differences between the City's existing Zoning Map (Exhibit 3-4) and the proposed Zoning Map (Exhibit 3-5) which are found within six key areas. The location of the six key areas are depicted on both the existing and proposed Zoning Maps. The first difference is that the proposed Zoning Map contains a new zoning district, Innovation. The second difference is the mix and location of zoning districts within the six key areas.

Zoning Map Changes

A summary of the changes in the mix and location of zoning map changes within the six key areas depicted on Exhibits 3-4 and 3-5 follows below.

Area One:

Location: Bordered by Elm Street to the south, Madison Avenue to the west, Guava Street to the north, and the I-15 to the east
Existing Zoning District: Office Research Park
Proposed Zoning District: Innovation

Area Two:

Location: Bordered by a residential subdivision to the north, the City's boundary with the City of Temecula to the south, I -15 to the west, and residential subdivisions, open space areas and a creek to the east.
Existing Zoning Districts: Office; Multi-Family 2, Residential; Community Commercial; Single-Family 1, Residential
Proposed Zoning Districts: Innovation; Open Space; Community Commercial; Multi-Family 2, Residential

Area Three:

Location: Bordered by Murrieta Hot Springs Road to the south, Sparkman Drive to the west, Medical Center Drive to the north, and Hancock Avenue to the east.
Existing Zoning Districts: Office Research Park; Civic and Institutional
Proposed Zoning District: Community Commercial

Area Four:

Location: Bordered by Whitewood Road and I-215 to the west, Baxter Road to the north, Menifee Road to the east, and Los Alamos Road to the southeast.
Existing Zoning Districts: Office Research Park; Rural Residential
Proposed Zoning Districts: Innovation; Single-Family 2, Residential; Multi-family

2, Residential; Open Space

Area Five:

Location: Bordered by the City's boundary with the County of Riverside to the north, Open Space areas to the west, I-215 to the east, and Linnel Lane to the south.
Existing Zoning District: Office
Proposed Zoning Districts: Innovation; Single-Family 1, Residential; Multi-family 2, Residential; Multi-family 3, Residential

Area Six:

Location: Bordered by Big Dipper Way, Via Mira Mosa, and Ariel Street to the south, Maximillian Avenue to the east, Donald Road to the north, and open space areas to the west.
Existing Zoning District: Specific Plan
Proposed Zoning District: Specific Plan (Open Space)

4.0 New Environmental Analysis

Section 4.0, New Environmental Analysis, evaluates the impacts associated with implementation of the proposed Project. This section contains a detailed environmental analysis of the existing conditions, proposed Project impacts, recommended mitigation measures, and unavoidable adverse impacts for a number of environmental topic areas. Mitigation measures that are incorporated into the proposed Project in the form of goals and policies are described and additional mitigation measures, which may be required to mitigate proposed Project impacts, are recommended.

4.1 Land Use and Planning

4.1.1 Regulatory Setting

No significant changes in the land use regulatory setting have occurred since the 2011 General Plan EIR. However, the proposed Project also includes policy revisions to address changes in State law enacted since the adoption of the 2011 General Plan. Key policy updates since the 2011 General Plan addressed in the proposed Project include:

- Wildfire risks and preparation (SB 1249)
- Climate adaptation and resiliency (SB 379)
- Transitioning to VMT analysis from LOS for traffic (SB 743)
- Environmental justice (SB 1000)

4.1.2 Environmental Setting

No significant changes in the environmental setting have occurred since the 2011 General Plan EIR.

4.1.3 Significance Threshold Criteria

Land use and planning impacts resulting from the implementation of the proposed Project may be considered significant if they would result in the following:

- Physically divide an established community?
- Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?

Based on these significance thresholds and criteria, the proposed Project's effects have been categorized as either "no impact," a "less than significant impact," or a "potentially significant impact." Mitigation measures are recommended for potentially significant impacts. If a potentially significant impact cannot be reduced to a less than significant level through the application of mitigation, it is categorized as a significant unavoidable impact.

4.1.4 Project Impacts and Mitigation Measures

IMPLEMENTATION OF THE PROPOSED PROJECT COULD DISRUPT OR PHYSICALLY DIVIDE AN ESTABLISHED COMMUNITY.

Level of Significance Before Mitigation: Less Than Significant Impact

Impact Analysis: Implementation of the proposed Project would not result in any direct impacts regarding land use compatibility within the City. The purpose of the General Plan, General Plan Land Use Policy Map and Zoning Map is to provide for a compatible pattern of development. A primary focus of the proposed Project is to evaluate the Office Research Park designation and modify the organization and location of land use designations and zoning classifications in key areas of the City. The proposed Project involves land use changes within six areas as discussed in Section 3.0, Project Description.

Area One is located in the southern portion of the City west of I-15. Area One and environs include limited residential uses, commercial uses, business park uses, industrial uses as well as vacant or underutilized properties. The proposed uses would help to create a major employment area. The potential uses would be compatible with uses within the existing area. Thus, the proposed land use changes would not divide an established community.

Area Two is located in the southernmost portion of the City east of I-15. Area Two and environs include residential and commercial uses as well as vacant or open space areas and portions of the Warms Springs Creek. Commercial uses are located along the east side of Jackson Avenue which runs parallel to 1-15. A mobile home park is located south of Elm Street and east of the I-15. Open space areas and Warm Springs Creek are located within the eastern and southern portions of Area Two. East and north of Area Two are residential, vacant lands, and open space areas. The proposed project would allow a mix of employment uses, residential uses and open space. Portions of Warm Springs Creek and surrounding open space areas will be protected from development and help to provide a buffer to residential areas located west and east of the creek. Thus, the proposed land use changes would not divide an established community.

Area Three is bordered by Murrieta Hot Springs Road to the south, Sparkman Drive to

the west, Medical Center Drive to the north, and Hancock Avenue to the east. Existing uses in Area Three and environs include commercial uses, offices and vacant/open space areas. The potential commercial uses would be compatible with existing uses within the area. Thus, the proposed land use changes would not divide an established community.

Area Four is bordered by Whitewood Road and I-215 to the west, Baxter Road to the north, Menifee Road to the east, and Los Alamos Road to the southeast. Existing land uses in Area Four and environs include residential uses, open space/undeveloped areas, commercial uses, and a high school. Proposed uses would allow for employment uses, residential uses and open space and parks. Thus, the proposed land use changes would not divide an established community.

Area Five is bordered by the City's boundary with the County of Riverside to the north, open space areas to the west, I-215 to the east, and Linnel Lane to the south. Area Five is largely undeveloped. The area contains several single family houses of varying size and condition as well as a cell tower. Open space areas are located to the west and north of Area Five. Commercial uses, undeveloped land and residential uses are located south of Area Five. Proposed uses would allow for residential uses and employment uses. The potential uses would be compatible with existing uses within the area. Thus, the proposed land use changes would not divide an established community.

Area Six is bordered by Big Dipper Way, Via Mira Mosa, and Ariel Street to the south, Maximillian Avenue to the east, Donald Road to the north, and open space areas to the west. Area Six includes open space/undeveloped lands. Existing residential uses are located north, east, and south of Area Six. The potential uses would include open space. The potential uses would be compatible with existing uses within the area. Thus, the proposed land use changes would not divide an established community.

The proposed General Plan 2035 Land Use Policy Map (Exhibit 3-3) and the proposed Zoning Map (Exhibit 3-5), in Section 3.0, establish consistent and compatible development intensities to ensure existing and future land uses would not negatively impact adjacent and surrounding uses. Implementation of the proposed Project would not result in any direct impacts regarding land use compatibility with surrounding jurisdictions. Further, the goals and policies identified in the 2011 General Plan and the proposed Project are designed to preserve and improve existing and future physical development by ensuring that adjacent land uses are compatible with one another. Therefore, impacts would be less than significant in this regard.

Mitigation Measures: No mitigation measures beyond the goals and policies in the proposed Project are required.

Level of Significance After Mitigation: Not Applicable.

Land Use Plan, Policy, or Regulation

IMPLEMENTATION OF THE PROPOSED PROJECT COULD CAUSE A SIGNIFICANT ENVIRONMENTAL IMPACT DUE TO A CONFLICT WITH ANY LAND USE PLAN, POLICY, OR REGULATION ADOPTED FOR THE PURPOSE OF AVOIDING OR MITIGATING AN ENVIRONMENTAL EFFECT?

Level of Significance Before Mitigation: Less Than Significant Impact.

Impact Analysis: Implementation of the proposed Project would not cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. The proposed Project addresses new State laws since 2011 including: wildfire risks and preparation (SB 1249), climate adaptation and resiliency (SB 379); transitioning to Vehicle Miles Travelled analysis from Level of Service for traffic (SB 743); environmental justice (SB 1000) and the dissolution of redevelopment agencies. The proposed Project also includes a revised mix and location of land use designations and zoning classifications within the six key areas along with a new land use designation, Innovation, and a new zoning classification (Innovation) that offer a greater variety of allowable uses than the existing Office Research Park designation. The proposed Project would have a beneficial effect by making the General Plan and the Development Code a more effective tool to review future projects and to coordinate with other jurisdictions and regulatory agencies on regional planning and environmental matters. In addition, the proposed Innovation zoning classification is consistent with the proposed Project's new Innovation land use designation. The zoning code amendment also includes map revisions to ensure consistency with the proposed General Plan Land Use Policy Map. Therefore, impacts would be less than significant in this regard.

Mitigation Measures: No mitigation measures beyond the goals and policies in the proposed Project are required.

Level of Significance After Mitigation: Not Applicable.

4.1.5 Cumulative Impacts and Mitigation Measures

- **DEVELOPMENT ASSOCIATED WITH IMPLEMENTATION OF THE PROPOSED PROJECT AND CUMULATIVE DEVELOPMENT COULD RESULT IN CUMULATIVELY CONSIDERABLE LAND USE IMPACTS.**

Level of Significance Before Mitigation: Less Than Significant Impact.

Impact Analysis: The proposed Project establishes the vision for the City to focus its efforts to attract a variety of businesses and industries, higher educational institutions, and health care facilities, while preserving its existing residential areas. The proposed uses and their distribution will help to stimulate economic development within major employment areas and allow for additional housing and parks/open space areas. While the proposed Project would increase the number of dwelling units by 1,572, there would also be a reduction of 2,405,601 square feet of non-residential uses. As such, the growth forecast between the 2011 General Plan and the proposed Project is relatively consistent. In addition, all future developments under the proposed Project would be required to mitigate land use impacts on a project-by-project basis. Therefore the incremental impact of the proposed Project, when considered in combination with development within the subregion, would not result in cumulatively considerable land use impacts.

Mitigation Measures: No mitigation measures beyond the goals and policies in the proposed Project are required.

Level of Significance After Mitigation: Not Applicable.

4.1.6 Significant Unavoidable Impacts

Land Use impacts associated with implementation of the proposed Project would be less than significant by adherence to and/or compliance with goals and policies in the proposed Project. No significant unavoidable land use impacts would occur as a result of buildout of the proposed Project.

4.1.7 Sources Cited

City of Murrieta General Plan and Environmental Impact Report, 2011.

4.2 Transportation

This section addresses the City of Murrieta's existing traffic conditions, the impacts of future traffic growth, planned physical improvements, and additional improvements to accommodate growth expected with the proposed Project. This section is based upon the (August 21, 2019) *Traffic Impact Analysis* (2019 TIA), prepared by Iteris and the (August 16, 2019) Vehicle Miles Traveled (VMT) Analysis Memorandum prepared by VRPA Technologies. The studies are included as Appendix E. For all other intersection and/or roadway segments, refer to the previous 2011 Certified EIR.

4.2.1 Regulatory Setting

Since the certification of the 2011 General Plan EIR, the state of California has amended its significance criteria for transportation. The significance criteria for transportation that is listed below in Section 4.2.3 (Significance Criteria Thresholds) is different than the criteria used in the 2011 Certified EIR (Section 5.4.3). The most significant difference in the criteria relates to Vehicle Miles Traveled (VMT) and California Senate Bill 743 which is described below.

CALIFORNIA STATE SENATE BILL 743 (SB 743)

SB 743 (Steinberg, 2013) creates a process to change the way that transportation impacts are analyzed under CEQA. Specifically, it requires the Governor's Office of Planning and Research (OPR) to identify new metrics for identifying and mitigating transportation impacts. OPR identified VMT as the new metric for transportation analysis. VMT refers to the amount and distance of automobile travel attributable to a project. Determining the significance of transportation projects as it relates to SB 743 is defined in CEQA Guidelines section 15064.3. The City of Murrieta has the discretion (per CEQA Guidelines section 15064.3) to choose the most appropriate methodology to evaluate a project's VMT, including whether to express the change in absolute terms, per capita, per household or in any other measure; in addition, the City of Murrieta may use models to estimate a project's VMT and may revise those estimates to reflect professional judgment based on substantial evidence. For the purposes of this General Plan Update, a decrease in VMT compared to the 2011 General Plan should be presumed to have a less than significant transportation impact.

4.2.2 Environmental Setting

This section is based upon the 2019 TIA and describes the intersections and roadway segments studied and methodology utilized in the 2019 TIA. For all other intersections and/or roadway segments not discussed below, refer to the previous 2011 Certified EIR.

STUDY AREA

The study area for analysis of the 2019 TIA includes the following twenty-three (23) intersections within the City or sphere of influence. Exhibit 4.2-1 (Figure 1-2 in the TIA) shows

the locations of the study intersections. Note that three of the locations are future intersections. The intersections represent key locations in the vicinity of the land use change areas, where major arterials intersect, and where land use trip distribution is anticipated.

1. Jefferson Avenue/Murrieta Hot Springs Road
2. Madison Avenue/Murrieta Hot Springs Road
3. Menifee Road/Scott Road (sphere of influence)
4. Winchester Road (SR-79)/Scott Road (sphere of influence)
5. Antelope Road/Keller Road (renamed Warm Springs Parkway/Keller Road in future conditions)
6. Antelope Road/Baxter Road (renamed Warm Springs Parkway/Baxter Road in future conditions)
7. California Oaks Road/Clinton Keith Road
8. Jefferson Avenue/Kalmia Street
9. Winchester Road (SR-79)/Murrieta Hot Springs Road
10. Hancock Avenue/Los Alamos Road
11. I-215 Southbound Ramps/Los Alamos Road
12. Whitewood Road/Murrieta Hot Springs Road
13. Nutmeg Street/Clinton Keith Road
14. Leon Road/Scott Road (sphere of influence)
15. Mitchell Road/Clinton Keith Road
16. I-215 Northbound Ramps/Clinton Keith Road
17. Whitewood Road/Clinton Keith Road
18. Jefferson Avenue/Los Alamos Road
19. Whitewood Road/Linnel Lane
20. Whitewood Road/Baxter Road
21. Warm Springs Parkway/Linnel Lane (future intersection)
22. Briggs Road/Keller Road (future intersection, sphere of influence)
23. Winchester Road (SR-79)/Clinton Keith Road-Benton Road (future intersection)

In addition, the study area for analysis includes the following twenty-two (22) roadway segments within the City or sphere of influence:

1. Scott Road east of Menifee Road
2. Scott Road between Leon Road and Winchester Road (SR-79)
3. Keller Road between I-215 and Whitewood Road
4. Keller Road east of Whitewood Road (future conditions only)

5. Baxter Road between Antelope Road and Whitewood Road
6. Antelope Road between Baxter Road and Clinton Keith Road
7. Whitewood Road between Baxter Road and Clinton Keith Road
8. Clinton Keith Road west of Nutmeg Street
9. Clinton Keith Road east of California Oaks Road
10. Clinton Keith Road between I-215 and Whitewood Road
11. Clinton Keith Road east of Whitewood Road
12. California Oaks Road south of Clinton Keith Road
13. California Oaks Road south of I-15
14. Jefferson Avenue south of California Oaks Road
15. Los Alamos Road between I-215 and Whitewood Road
16. Los Alamos Road between Monroe Avenue and Hancock Avenue
17. Whitewood Road north of Murrieta Hot Springs Road
18. Jefferson Avenue south of Murrieta Hot Springs Road
19. Murrieta Hot Springs Road between I-15 and I-215
20. Murrieta Hot Springs Road between Alta Murrieta Drive and Whitewood Road
21. Murrieta Hot Springs Road between Whitewood Road and Margarita Road
22. Murrieta Hot Springs Road between Margarita Road and Winchester Road (SR-79)

ROADWAY CONFIRGURATIONS

Below are descriptions of the existing characteristics of key roadways in the study area:

- Keller Road, oriented in an east-west direction, is a two- to three-lane undivided roadway within the City of Murrieta. As part of the Circulation Element, Keller Road is planned to provide access to I-215 via a future interchange. The posted speed limit is 40 mph.
- Clinton Keith Road, oriented in an east-west direction, is generally a four-lane roadway west of I-215, providing access to both I-15 and I-215 via interchanges. East of I-215, Clinton Keith Road is a six-lane divided roadway that currently terminates at Leon Road. The posted speed limit is 50 mph west of I-215 and 45 mph east of I-215.
- California Oaks Road, oriented in a northeast-southwest direction, is a four-lane divided roadway providing access to I-15. California Oaks Road terminates on the north at Clinton Keith Road. The posted speed limit is 40 mph west of Jackson Avenue and 45 mph east of Jackson Avenue.
- Los Alamos Road, oriented in a northeast-southwest direction, is a four lane divided roadway providing access to I-215. The posted speed limit is 45 mph. West of Jefferson Avenue, Los Alamos Road transitions to a two-lane roadway with the name changing to Ivy Street.

- Murrieta Hot Springs Road, oriented in an east-west direction, is generally a six-lane divided roadway providing access to both I-15 and I-215 via interchanges. West of I-15, Murrieta Hot Springs Road terminates at Jefferson Avenue. The posted speed limit is 45 mph.
- Jefferson Avenue, oriented in a northwest-southeast direction, is generally a four-lane divided roadway (two-lane sections exist) running parallel to I-15. Jefferson Avenue terminates on the north end at Grizzly Ridge Drive. The posted speed limit varies between 40, 45, and 50 mph.
- Whitewood Road, oriented in a north-south direction, is a four-lane divided roadway running parallel to I- 215. Whitewood Road terminates on the south within a residential area south of Murrieta Hot Springs Road. The posted speed limit is 45 mph.

GENERAL METHODOLOGY

The quality of traffic operations is now characterized using the concept of VMT. The VMT method refers to the amount and distance of automobile travel attributable to a project. As opposed to the 2011 General Plan which used the concept of level of service (LOS).

LOS is defined by a range of grades from A (best) to F (worst). At intersections, LOS "A" represents relatively free flow operating conditions with little or no delay. LOS "F" is characterized by extremely unstable flow conditions, severe congestion and delays with traffic volumes at or near the intersection's design capacity. The City of Murrieta uses LOS as a tool for defining areas where intersection improvements and roadway configurations could be upgraded.

VMT is typically calculated using travel demand models, which estimate the total number and length of vehicle trips for a given area. The proposed Project includes a VMT analysis memorandum included as Appendix G. The VMT analysis compares the existing and proposed land-use designations discussed in section 4-1 and determines an increase or decrease in VMT. The analysis is completed by the following two calculations:

1. Adjustment for employment-related land uses: Increase in Daily VMT = Excess Employees x Average Daily Trips per Employee x (Average Trip Length to External County Job Location – Average Trip Length to Murrieta Job Location)

2. Adjustment for residential units near the proposed Innovation center: Increase in Daily VMT = Residential Units Oriented Toward Innovation Center x Average Daily Employment Trips per Unit x (Average Trip Length to External County Job Location – Average Trip Length to Innovation Center)

The baseline VMT methodology and data were calculated for 2040 conditions, based on the VMT results produced by the regional transportation model. VMT results were calculated for the base year 2016 using the regional transportation model's base year scenario which looks at; population plus employment, home-based VMT per capita, and home-based work. VMT's per worker were calculated using outputs from the Southern California Association of Governments' (SCAG) Regional Transportation Plan travel forecasting model and the Riverside County Transportation Analysis Model (RIVTAM). VMT results were calculated for years 2020, 2030, and 2035 using linear interpolation of the results for 2016 and 2040.

LEVEL OF SERVICE ANALYSIS

The LOS analysis provided below provides a detailed assessment of the traffic operations within the City of Murrieta. Analysis of traffic operations were conducted using the Highway Capacity Manual (HCM) 2010 Edition. LOS analysis was calculated at the study area intersections using Synchro 9 software. All traffic signal phasing splits were optimized for the purposes of this analysis. Table 4.2-1 presents a brief description of each level of service letter grade, as well as the range of HCM average intersection delay associated with each grade for both signalized and unsignalized intersections.

Table 4.2-1: Intersection Level of Service Definitions

Level Of Service	Description	Signalized Intersection Delay (seconds per vehicle)	Unsignalized Intersection Delay (seconds per vehicle)
A	Excellent operation. All approaches to the intersection appear quite open, turning movements are easily made, and nearly all drivers find freedom of operation.	< 10	< 10
B	Very good operation. Many drivers begin to feel somewhat restricted within platoons of vehicles. This represents stable flow. An approach to an intersection may occasionally be fully utilized and traffic queues start to form.	>10 and < 20	>10 and < 15
C	Good operation. Occasionally drivers may have to wait more than 60 seconds, and back-ups may develop behind turning vehicles. Most drivers feel somewhat restricted.	>20 and < 35	>15 and < 25
D	Fair operation. Cars are sometimes required to wait more than 60 seconds during short peaks. There are no long-standing traffic queues.	>35 and < 55	>25 and < 35
E	Poor operation. Some long-standing vehicular queues develop on critical approaches to intersections. Delays may be up to several minutes.	>55 and < 80	>35 and < 50
F	Forced flow. Represents jammed conditions. Backups form locations downstream or on the cross street may restrict or prevent movement of vehicles out of the intersection approach lanes; therefore, volumes carried are not predictable. Potential for stop and go type traffic flow.	> 80	> 50

The City's Level of Service standard, as published in the City's current General Plan, Chapter IV, is LOS D for peak hour intersection operations. Table 4.2-2 presents the daily roadway capacity values per the current Circulation Element, for use in the roadway segment LOS analysis.

Table 4.2-2: Daily Roadway Capacity

Facility	Lane Configuration	Maximum Capacity (veh/day)
Collector	2-lane Divided	13,000
Secondary	4-lane Divided	25,900
Major	4-lane Divided	34,100
Arterial	4-lane Divided	35,900
Arterial and Urban Arterial	6-lane Divided	53,900
Augmented Urban Arterial	8-lane Divided	71,800

Table 4.2-3 summarizes the LOS criteria, measured in terms of Volume-to-Capacity ratio, for use in the roadway segment analysis.

Table 4.2-3: Roadway Segment Level of Service Criteria

Level of Service (LOS)	Volume-to-Capacity Ratio
A	0.00 – 0.60
B	> 0.60 – 0.70
C	> 0.70 – 0.80
D	> 0.80 – 0.90
E	> 0.90 – 1.00
F	> 1.00

The City's Level of Service standard is LOS C for roadway segment operations, unless segments are within General Plan Focus Areas where LOS D is allowed.

Roadway Segments:
Traffic volume increases from public or private projects that result in the following criteria will have a significant traffic volume or level of service traffic operations impact on a roadway segment:

- The additional or redistributed ADT generated by the proposed Project will significantly increase congestion on a roadway segment currently operating at LOS E or F, or will cause a roadway segment to operate at LOS E or LOS F as a result of the proposed Project as identified in Table 4.2-4.

Table 4.2-4: Measures of Significant Project Impacts to Congestion on Roadway Segments

Level of Service	Volume-to-Capacity Ratio		
	Two-lane Road	Two-lane Road	Six-lane Road
LOS E	200 ADT	400 ADT	600 ADT
LOS F	100 ADT	200 ADT	300 ADT

Notes:
1. By adding proposed project trips to all other trips from a list of projects, this same table must be used to determine if total cumulative impacts are significant. If cumulative impacts are found to be significant, each project that contributes additional trips must mitigate a share of the cumulative impacts.
2. The City may also determine impacts have occurred on roads even where a project's traffic or cumulative impacts do not trigger an unacceptable level of service, when such traffic uses a significant amount of remaining roadway capacity.

Intersections:
Table 4.2-5 summarizes the proposed Project impacts for signalized and unsignalized intersections.

Signalized
The additional or redistributed ADT generated by the proposed Project will significantly increase congestion on a signalized intersection operating at LOS E or LOS F, or will cause a signalized intersection to operate at LOS E or LOS F as identified in Table 4.2-5.

Unsignalized
Traffic volume increases from public or private projects that result in one or more of the following criteria will have a significant impact to an unsignalized intersection as listed in Table 4.2-5 and described in text below:

- The additional or redistributed traffic generated by the proposed Project will add 21 or more peak hour trips to a critical movement of an unsignalized intersection, and cause an unsignalized intersection to operate below LOS D, or
- The additional or redistributed traffic generated by the proposed Project will add 21 or more peak hour trips to a critical movement of an unsignalized intersection currently operating at LOS E, or
- The additional or redistributed traffic generated by the proposed Project will add 6 or more peak hour trips to a critical movement of an unsignalized intersection, and cause the unsignalized intersection to operate at LOS F, or
- The additional or redistributed traffic generated by the proposed Project will add 6 or more peak hour trips to a critical movement of an unsignalized intersection currently operating at LOS F, or
- Based upon an evaluation of existing accident rates, the signal prioritization list, intersection geometrics, proximity of adjacent driveways, sight distance or other factors, the project would significantly impact the operations of the intersection.

Table 4.2-5: Measures of Significant Project Impacts to Congestion on Intersections

Level of Service	Allowable Increases on Congested Intersections	
	Signalized	Unsignalized
LOS E	Delay of 2 seconds or less	20 or less peak hour trips on a critical movement
LOS F	Either a delay of 1 second, or 5 peak hour trips or less on a critical movement	5 or less peak hour trips on a critical movement

Notes:
1. A critical movement is an intersection movement (left-turn, through movement, right-turn) that experiences excessive queues, which typically operate at LOS F. Also, if a project adds significant volume to a minor roadway approach, a gap study should be provided that details the headways between vehicles on the major roadway.
2. By adding proposed project trips to all other trips from a list of projects, these same tables are used to determine if total cumulative impacts are significant. If cumulative impacts are found to be significant, each project is responsible for mitigating its share of the cumulative impact.
3. The City may also determine impacts have occurred at intersections even when a project's direct or cumulative impacts do not trigger an unacceptable level of service, when such traffic uses a significant amount of remaining intersection capacity.
4. For determining significance at signalized intersections with LOS F conditions, the analysis must evaluate both the delay and the number of trips on a critical movement. Exceedance of either criteria results in a significant impact.

TRAFFIC FORECASTING

The traffic forecasting approach, as discussed in the 2019 TIA, involved the development of a focused multi-modal, multi-class travel demand model for the City of Murrieta. This focused model is consistent with the 2016 SCAG RTP/SCS travel demand model assumptions and inputs as well as compatible with the current City of Murrieta Transportation Analysis Zone (TAZ) structure and land use as part of the adopted General Plan. The base year of 2016 and the forecast year of 2040 were obtained from the 2016 SCAG RTP/SCS travel demand model. The Model was developed using the TransCAD software package, the software platform currently used by SCAG for regional modeling. The City's highway network was updated and refined to include all key general plan roadways in the City of Murrieta. The transit network was also reviewed and found to be a satisfactory representation of transit services. The Model is consistent with the traditional four step modeling process, which includes trip generation, trip distribution, mode split, and traffic assignment.

The zone structure of the 2040 forecast year is identical to the zone structure of the base year, with only data inputs being modified. The land use data, described in Table 4.2-6 below, for each TAZ is converted to three (3) major socioeconomic variables (population, households and employment) and further disaggregated into secondary variables (e.g. household size, age, income level, employment type, etc.). Table 4.2-7 summarizes the socioeconomic data (SED) under the currently adopted General Plan, the proposed Project, and the net change, applied as part of the traffic forecasting process.

Table 4.2-6: Proposed Project Net Land Use Changes

Land Use Description	Net Change
Large Lot Residential	-32 dwelling units
Single-Family Residential	-192 dwelling units
Multi-family Residential	+1,796 dwelling units
Commercial	+176,749 sq ft
Office & Research Park	-9,841,655 sq ft
Civic & Institutional	-91 sq ft
Innovation (new)	+7,259,396 sq ft
Mixed-Use	0 sq ft
Business Park	0 sq ft
Industrial	0 sq ft

Table 4.2-7: Citywide Socioeconomic Data Summary

Year	Currently Adopted General Plan			Focused General Plan Update			Net Change		
	HH	Pop	Emp	HH	Pop	Emp	HH	Pop	Emp
2040	44,805	135,419	95,029	46,377	139,825	92,087	1,572	4,406	-2,942

Note: HH = Households, Pop = Population, Emp = Employment

The buildout year in the currently adopted General Plan is 2035. Thus, the year 2040 volumes were interpolated to the year 2035 and were used for the purposes of analyzing the traffic impacts of the focused proposed Project, as opposed to 2040 which were taken directly from the 2016 SCAG RTP/SCS travel-demand model. The future year 2035 circulation network is anticipated to be modified significantly from the current network. For example, major planned enhancements such as a new I-215 interchange at Keller Road, extension of Keller Road to Leon Road, extension of Clinton Keith Road east of Whitewood Road, and a new Warm Springs Parkway running parallel to I-215 are anticipated in the City's buildout condition. As such, more so than simply a change in traffic volume magnitude, traffic patterns in the study area will be largely different than existing conditions. Existing turning movement count data is typically used as a "pivot point" for projecting future year turning movement volumes, where intersection and roadway capacities remain mostly static between baseline and future (i.e., a currently built out environment). However, considering Murrieta's long-range planned buildout condition, this method is not applicable. Rather, turning movement volumes at the study intersections are acquired directly from the model, consistently applied to the "without project" and "with project" conditions. Future year peak hour turning movements acquired from the traffic model were adjusted to year 2035, from the model buildout year 2040. As part of typical post-processing, turning movements were scaled and balanced where appropriate in order to ensure consistent traffic flow.

4.2.3 Significance Threshold Criteria:

Since the certification of the 2011 General Plan EIR, the state of California has amended its significance criteria as discussed above in Section 4.2.1. SB 743 changes the requirements local agencies use to determine transportation impacts under CEQA. Historically, delay and congestion were the metrics used when evaluating transportation issues. To implement the legislation, lead agencies will need to determine appropriate VMT methodologies, thresholds, and feasible mitigation measures. According to Section 15064.7 of the CEQA Guidelines, lead agencies have discretion when setting significance thresholds.

Traffic and circulation impacts resulting from the implementation of the proposed Project may be considered significant if they would result in the following:

- Conflict with a program plan, ordinance or policy addressing the circulation system, including transit roadway, bicycle and pedestrian facilities.
- Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).
- Result in inadequate emergency access.
- Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)

Based on these standards, the effects of the proposed Project have been categorized as either a “less than significant impact” or a “potentially significant impact.” Mitigation measures are recommended for potentially significant impacts. If a potentially significant impact cannot be reduced to a less than significant level through the application of mitigation, it is categorized as a significant unavoidable impact.

4.2.4 Project Impacts and Mitigation Measures

PROPOSED PROJECT TRAFFIC OPERATIONS

- **IMPLEMENTATION OF THE PROPOSED PROJECT COULD CONFLICT WITH A PROGRAM PLAN, ORDINANCE OR POLICY ADDRESSING THE CIRCULATION SYSTEM, INCLUDING TRANSIT ROADWAY, BICYCLE AND PEDESTRIAN FACILITIES.**

Level of Significance Before Mitigation: Potentially Significant Impact

Impact Analysis:

FUTURE YEAR 2035 WITHOUT PROJECT

As mentioned, the buildout year in the currently adopted General Plan is 2035. Thus, the year 2040 volumes were interpolated to the year 2035 and were used for the purposes of analyzing the traffic impacts of the focused General Plan Update, as opposed to 2040 which were taken directly from the 2016 SCAG RTP/SCS travel-demand model. This section presents the analysis of traffic operations with the buildout of the currently adopted General Plan (i.e.,

"without project" conditions) in 2035. Future year 2035 without project traffic volumes were developed based on traffic modeling and post-processing procedures described in Section 5 of the 2019 TIA.

INTERSECTIONS

Table 4.2-8 summarizes the future year 2035 without project peak hour LOS at the study intersections. Exhibit 4.2-2 (Figure 6-1 in the TIA) shows the Future Year 2035 without Project Intersection Volumes and Exhibit 4.2-3 (Figure 6-2 in the TIA) shows the Future Year 2035 without Project Intersection Land Configurations. As shown in Table 4.2-8, the following 12 intersections are forecast to operate at LOS E or F:

- Jefferson Avenue/Murrieta Hot Springs Road
- Madison Avenue/Murrieta Hot Springs Road
- Winchester Road (SR-79)/Scott Road
- Warm Springs Parkway/Baxter Road
- California Oaks Road/Clinton Keith Road
- Jefferson Avenue/Kalmia Street
- Winchester Road (SR-79)/Murrieta Hot Springs Road
- Hancock Avenue/Los Alamos Road
- Whitewood Road/Murrieta Hot Springs Road
- Whitewood Road/Clinton Keith Road
- Whitewood Road/Baxter Road
- Winchester Road (SR-79)/Clinton Keith Road

Table 4.2-8: Future Year 2035 Without Project Intersection Peak Hour Level of Service

Intersection		Control Type	AM Peak Hour		PM Peak Hour	
			Delay (sec)	LOS	Delay (sec)	LOS
1	Jefferson Ave/Murrieta Hot Springs Rd	signalized	**97.6**	**F**	**126.5**	**F**
2	Madison Ave/Murrieta Hot Springs Rd	signalized	46.9	D	**99.2**	**F**
3	Menifee Rd/Scott Rd	signalized	28.8	C	31.9	C
4	Winchester Rd (SR-79)/Scott Rd	signalized	50.3	D	**156.1**	**F**
5	Warm Springs Pkwy/Keller Rd	signalized	37.0	D	42.5	D
6	Warm Springs Pkwy/Baxter Rd	signalized	**67.1**	**E**	52.7	D
7	California Oaks Rd/Clinton Keith Rd	signalized	44.5	D	**63.7**	**E**
8	Jefferson Ave/Kalmia St	signalized	**58.7**	**E**	50.3	D
9	Winchester Rd (SR-79)/Murrieta Hot Springs Rd	signalized	**125.2**	**F**	**254.2**	**F**
10	Hancock Ave/Los Alamos Rd	signalized	**139.1**	**F**	**144.9**	**F**
11	I-215 SB Ramps/Los Alamos Rd	signalized	26.8	C	32.9	C
12	Whitewood Rd/Murrieta Hot Springs Rd	signalized	**96.1**	**F**	**143.9**	**F**
13	Nutmeg St/Clinton Keith Rd	signalized	30.7	C	32.2	C
14	Leon Rd/Scott Rd	signalized	14.4	B	12.7	B
15	Mitchell Rd/Clinton Keith Rd	signalized	34.9	C	34.7	C
16	I-215 NB Ramps/Clinton Keith Rd	signalized	29.1	C	35.9	D
17	Whitewood Rd/Clinton Keith Rd	signalized	**57.3**	**E**	**76.5**	**E**
18	Jefferson Avenue/Los Alamos Rd	signalized	28.3	C	37.7	D
19	Whitewood Rd/Linnel Ln	signalized	14.5	B	15.4	B
20	Whitewood Rd/Baxter Rd	signalized	25.6	C	**58.8**	**E**
21	Warm Springs Pkwy/Linnel Ln	signalized	16.9	B	29.0	C
22	Briggs Rd/Keller Rd	signalized	17.3	B	19.9	B
23	Winchester Rd (SR-79)/Clinton Keith Rd	signalized	**93.5**	**F**	**101.9**	**F**

Notes:
LOS = Level of Service.

ROADWAY SEGMENTS

Table 4.2-9 summarizes the future year 2035 without project V/C ratios and LOS at the roadway segments, assuming lane configurations consistent with the current Circulation Element as well as the maximum daily roadway capacity values per the current Circulation Element. As shown in Table 4.2-9, the following 6 roadways are forecast to operate at LOS D, E, or F in future year 2035 without project conditions:

- Clinton Keith Road east of California Oaks Road
- Jefferson Avenue south of California Oaks Road (acceptable, as part of GP focus area)
- Los Alamos Road between Monroe Avenue and Hancock Avenue
- Murrieta Hot Springs Road between I-15 and I-215
- Murrieta Hot Springs Road between Alta Murrieta Drive and Whitewood Road

- Murrieta Hot Springs Road between Whitewood Road and Margarita Road

Table 4.2-9: Future Year 2035 Without Project Daily Roadway Segment Level of Service

Segment		Lane Configuration	Capacity (vehicles/day)	2035 Without Project ADT	Volume to Capacity Ratio (V/C)	LOS
1	Scott Rd east of Menifee Rd	6D	53,900	9,550	0.18	A
2	Scott Rd between Leon Rd and Winchester Rd (SR-79)	6D	53,900	8,120	0.15	A
3	Keller Rd between I-215 and Whitewood Rd	6D	53,900	12,610	0.23	A
4	Keller Rd east of Whitewood Rd	4D	25,900	10,970	0.42	A
5	Baxter Rd between Antelope Rd and Whitewood Rd	4D	25,900	15,270	0.59	A
6	Warm Springs Pkwy between Baxter Rd and Clinton Keith Rd	4D	34,100	12,150	0.36	A
7	Whitewood Rd between Baxter Rd and Clinton Keith Rd	4D	34,100	12,250	0.36	A
8	Clinton Keith Rd west of Nutmeg St	6D	53,900	23,190	0.43	A
9	Clinton Keith Rd east of California Oaks Rd	6D	53,900	43,780	**0.81**	**D**
10	Clinton Keith Rd between I-215 and Whitewood Rd	6D	53,900	22,500	0.42	A
11	Clinton Keith Rd east of Whitewood Rd	6D	53,900	24,990	0.46	A
12	California Oaks Rd south of Clinton Keith Rd	4D	34,100	22,960	0.67	B
13	California Oaks Rd south of I-15	6D	53,900	25,130	0.47	A
14	Jefferson Ave south of California Oaks Rd	6D	53,900	44,190	**0.82**	**D**
15	Los Alamos Rd between I-215 and Whitewood Rd	6D	53,900	23,850	0.44	A
16	Los Alamos Rd between Monroe Ave and Hancock Ave	4D	34,100	36,560	**1.07**	**F**
17	Whitewood Rd north of Murrieta Hot Springs Rd	4D	34,100	6,040	0.18	A
18	Jefferson Ave south of Murrieta Hot Springs Rd	6D	53,900	37,150	0.69	B
19	Murrieta Hot Springs Rd between I-15 and I-215	8D	71,800	74,560	**1.04**	**F**
20	Murrieta Hot Springs Rd between Alta Murrieta Dr and Whitewood Rd	6D	53,900	49,280	**0.91**	**E**
21	Murrieta Hot Springs Rd between Whitewood Rd and Margarita Rd	6D	53,900	47,680	**0.88**	**D**
22	Murrieta Hot Springs Rd between Margarita Rd and Winchester Rd (SR-79)	6D	53,900	38,600	0.72	C

Notes:
ADT volume in 2035 is rounded to the nearest 10 vehicles.
LOS = Level of Service.

FUTURE YEAR 2035 WITH PROJECT

This section presents the analysis of traffic operations with the buildout of the proposed Project (i.e., "with project" conditions) in 2035. In addition, based on an initial model run and discussions with City Public Works Department staff, the following roadway classification or configuration modifications to the currently adopted circulation network were identified as shown on Exhibit 4.2-4 (Figure 7-1 in the TIA):

- Hawthorn Street is downgraded from an Arterial road (6-lane) (in the current Circulation Element) to a Secondary road (4-lane), between Washington Avenue and Jefferson Avenue;
- Monroe Avenue is downgraded from a Major road (4-lane) (in the current Circulation Element) to an Industrial Collector road (2-lane), between Guava Avenue and Larchmont Lane;
- Ivy Street is downgraded from a Major road (in the current Circulation Element) to a Secondary road, between Washington Avenue and Jefferson Avenue; and
- Madison Avenue is downgraded from a Major road (in the current Circulation Element) to a Secondary road, between Guava Street and Date Street.

INTERSECTIONS

Table 4.2-10 summarizes the future year 2035 with project peak hour LOS at the study intersections. With the exception of the downgraded roadway classifications described, the LOS analysis utilizes the same intersection lane configurations used in the "without project" scenario. Exhibit 4.2-5 (Figure 7-2 in the TIA) shows the future year 2035 with project peak hour intersection volumes.

As shown in Table 4.2-10, traffic related to proposed Project's land use modifications are forecast to result in significant traffic impacts, based on the significance criteria, during one or both peak hours, at the following fifteen (15) intersections in future year 2035:

- Jefferson Avenue/Murrieta Hot Springs Road
- Madison Avenue/Murrieta Hot Springs Road
- Warm Springs Parkway/Baxter Road
- California Oaks Road/Clinton Keith Road
- Jefferson Avenue/Kalmia Street
- Winchester Road (SR-79)/Murrieta Hot Springs Road
- Hancock Avenue/Los Alamos Road
- Whitewood Road/Murrieta Hot Springs Road
- Nutmeg Street/Clinton Keith Road
- Mitchell Road/Clinton Keith Road
- I-215 Northbound Ramps/Clinton Keith Road
- Whitewood Road/Clinton Keith Road
- Whitewood Road/Baxter Road
- Warm Springs Parkway/Linnel Lane
- Winchester Road (SR-79)/Clinton Keith Road

Table 4.2-10: Future Year 2035 With Project Intersection Peak Hour Level of Service

	Intersection	Future Year 2035 Without Project				Future Year 2035 With Project				Change in AM Delay (sec)	Change in PM Delay (sec)	Significant Impact?
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour				
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS			
1	Jefferson Ave/Murrieta Hot Springs Rd	**97.6**	**F**	**126.5**	**F**	**186.3**	**F**	**163.2**	**F**	88.7	36.7	Yes
2	Madison Ave/Murrieta Hot Springs Rd	46.9	D	**99.2**	**F**	**55.5**	**E**	**108.9**	**F**	8.6	9.7	**Yes**
3	Menifee Rd/Scott Rd	28.8	C	31.9	C	28.7	C	30.8	C	-0.1	-1.1	No
4	Winchester Rd (SR-79)/Scott Rd	50.3	D	**156.1**	**F**	50.3	D	**135.9**	**F**	0.0	-20.2	No
5	Warm Springs Pkwy/Keller Rd	37.0	D	42.5	D	37.4	D	40.3	D	0.4	-2.2	No
6	Warm Springs Pkwy/Baxter Rd	**67.1**	**E**	52.7	D	**68.7**	**E**	**72.5**	**E**	1.6	19.8	**Yes**
7	California Oaks Rd/Clinton Keith Rd	44.5	D	**63.7**	**E**	**79.7**	**E**	**91.4**	**F**	35.2	27.7	**Yes**
8	Jefferson Ave/Kalmia St	**58.7**	**E**	50.3	D	**153.5**	**F**	**75.0**	**E**	94.8	24.7	**Yes**
9	Winchester Rd (SR-79)/Murrieta Hot Springs Rd	**125.2**	**F**	**254.2**	**F**	**197.2**	**F**	**299.8**	**F**	72.0	45.6	Yes
10	Hancock Ave/Los Alamos Rd	**139.1**	**F**	**144.9**	**F**	**160.2**	**F**	**188.1**	**F**	21.1	43.2	Yes
11	I-215 SB Ramps/Los Alamos Rd	26.8	C	32.9	C	32.4	C	52.6	D	5.6	19.7	No
12	Whitewood Rd/Murrieta Hot Springs Rd	**96.1**	**F**	**143.9**	**F**	**130.1**	**F**	**160.4**	**F**	34.0	16.5	Yes
13	Nutmeg St/Clinton Keith Rd	30.7	C	32.2	C	**161.2**	**F**	**126.3**	**F**	130.5	94.1	**Yes**
14	Leon Rd/Scott Rd	14.4	B	12.7	B	14.4	B	12.6	B	0.0	-0.1	No
15	Mitchell Rd/Clinton Keith Rd	34.9	C	34.7	C	**63.0**	**E**	**62.5**	**E**	28.1	27.8	**Yes**
16	I-215 NB Ramps/Clinton Keith Rd	29.1	C	35.9	D	**65.3**	**E**	42.6	D	36.2	6.7	**Yes**
17	Whitewood Rd/Clinton Keith Rd	**57.3**	**E**	**76.5**	**E**	52.2	D	**85.3**	**F**	-5.1	8.8	Yes
18	Jefferson Avenue/Los Alamos Rd	28.3	C	37.7	D	29.6	C	53.0	D	1.3	15.3	No
19	Whitewood Rd/Linnel Ln	14.5	B	15.4	B	15.3	B	19.6	B	0.8	4.2	No
20	Whitewood Rd/Baxter Rd	25.6	C	**58.8**	**E**	28.4	C	**65.8**	**E**	2.8	7.0	Yes
21	Warm Springs Pkwy/Linnel Ln	16.9	B	29.0	C	23.6	C	**75.5**	**E**	6.7	46.5	**Yes**
22	Briggs Rd/Keller Rd	17.3	B	19.9	B	23.1	C	25.3	C	5.8	5.4	No
23	Winchester Rd (SR-79)/Clinton Keith Rd	**93.5**	**F**	**101.9**	**F**	**104.6**	**F**	**155.3**	**F**	11.1	53.4	Yes

Notes: LOS = Level of Service.

ROADWAY SEGMENTS

Table 4.2-11 summarizes the future year 2035 with project V/C ratios and LOS at the roadway segments, assuming lane configurations consistent with the adopted Circulation Element as well as the maximum daily roadway capacity values per the adopted Circulation Element. With the exception of the downgraded roadway classifications described above, the LOS analysis utilizes the same roadway lane configurations used in the "without project" scenario. Exhibit 4.2-6 (Figure 7-3 in the TIA) shows the LOS, based on V/C ratio, at the roadway segments. As shown in Table 4.2-11, traffic related to the proposed Project's land use modifications are forecast to result in significant traffic impacts, based on the significant criteria, at the following seven (7) roadways in future year 2035 with project conditions:

- Clinton Keith Road east of California Oaks Road
- California Oaks Road south of Clinton Keith Road
- Jefferson Avenue south of California Oaks Road
- Los Alamos Road between Monroe Avenue and Hancock Avenue
- Murrieta Hot Springs Road between I-15 and I-215
- Murrieta Hot Springs Road between Alta Murrieta Drive and Whitewood Road
- Murrieta Hot Springs Road between Whitewood Road and Margarita Road

Table 4.2-11: Future Year 2035 With Project Daily Roadway Segment Level of Service

Segment		Lane Configuration	Capacity (vehicles/day)	2035 With Project ADT	Volume to Capacity Ratio (V/C)	LOS
1	Scott Rd east of Menifee Rd	6D	53,900	9,040	0.17	A
2	Scott Rd between Leon Rd and Winchester Rd (SR-79)	6D	53,900	8,120	0.15	A
3	Keller Rd between I-215 and Whitewood Rd	6D	53,900	15,460	0.29	A
4	Keller Rd east of Whitewood Rd	4D	25,900	11,660	0.45	A
5	Baxter Rd between Antelope Rd and Whitewood Rd	4D	25,900	16,040	0.62	B
6	Warm Springs Pkwy between Baxter Rd and Clinton Keith Rd	4D	34,100	11,020	0.32	A
7	Whitewood Rd between Baxter Rd and Clinton Keith Rd	4D	34,100	12,980	0.38	A
8	Clinton Keith Rd west of Nutmeg St	6D	53,900	27,410	0.51	A
9	Clinton Keith Rd east of California Oaks Rd	6D	53,900	57,630	1.07	**F**
10	Clinton Keith Rd between I-215 and Whitewood Rd	6D	53,900	27,400	0.51	A
11	Clinton Keith Rd east of Whitewood Rd	6D	53,900	30,930	0.57	A
12	California Oaks Rd south of Clinton Keith Rd	4D	34,100	31,470	0.92	**E**
13	California Oaks Rd south of I-15	6D	53,900	31,640	0.59	A
14	Jefferson Ave south of California Oaks Rd	6D	53,900	55,800	1.04	**F**
15	Los Alamos Rd between I-215 and Whitewood Rd	6D	53,900	31,690	0.59	A
16	Los Alamos Rd between Monroe Ave and Hancock Ave	4D	34,100	40,320	1.18	**F**
17	Whitewood Rd north of Murrieta Hot Springs Rd	4D	34,100	11,330	0.33	A
18	Jefferson Ave south of Murrieta Hot Springs Rd	6D	53,900	44,210	0.82	D
19	Murrieta Hot Springs Rd between I-15 and I-215	8D	71,800	79,600	1.11	**F**
20	Murrieta Hot Springs Rd between Alta Murrieta Dr and Whitewood Rd	6D	53,900	58,620	1.09	**F**
21	Murrieta Hot Springs Rd between Whitewood Rd and Margarita Rd	6D	53,900	58,330	1.08	**F**
22	Murrieta Hot Springs Rd between Margarita Rd and Winchester Rd (SR-79)	6D	53,900	42,440	0.79	C

Notes:
ADT volume in 2035 is rounded to the nearest 10 vehicles.
LOS = Level of Service.

Recommended Improvements:

Intersections:

Based on the results of the traffic impact analysis, several intersections are forecast to be impacted by the land use modifications from the Focused GPU proposed Project. In order to potentially alleviate the significant impacts, the following improvements are recommended in the City:

- **1. Jefferson Avenue/Murrieta Hot Springs Road** – At the westbound Murrieta Hot Springs Road approach, add a second left-turn lane. Modify the traffic signal phasing to include a northbound right-turn overlap phase.

- **2. Madison Avenue/Murrieta Hot Springs Road** – Widen the eastbound Murrieta Hot Springs Road approach to include a dedicated right-turn lane. Modify the traffic signal phasing to include a westbound right-turn overlap phase.

- **4. Winchester Road (SR-79)/Scott Road** – Modify the traffic signal phasing to include a westbound right-turn overlap phase.

- **6. Warm Springs Parkway/Baxter Road** – Widen the eastbound Baxter Road approach to include a dedicated right-turn lane and modify the traffic signal phasing to include an eastbound right-turn overlap phase.

- **7. California Oaks Road/Clinton Keith Road** - At the westbound Clinton Keith Road approach, add a second left-turn lane.

- **8. Jefferson Avenue/Kalmia Street** - At the southbound Jefferson Avenue approach, add a second left-turn lane. Widen the eastbound Kalmia Street approach to include a dedicated right-turn lane. Modify the traffic signal phasing to include protected plus permitted phasing at the Kalmia Street eastbound and westbound approaches.

- **9. Winchester Road (SR-79)/Murrieta Hot Springs Road** – No feasible improvements identified, significant unavoidable impact.

- **10. Hancock Avenue/Los Alamos Road** – No feasible improvements identified, significant unavoidable impact.

- **12. Whitewood Road/Murrieta Hot Springs Road** – Widen the westbound Murrieta Hot Springs Road approach to include a dedicated right-turn lane and modify the traffic signal phasing to include a westbound right-turn overlap phase.

- **13. Nutmeg Street/Clinton Keith Road** - At the westbound Clinton Keith Road approach, add a second left-turn lane. Convert the second northbound Nutmeg Street through lane to a dedicated right-turn lane (same configuration as existing conditions) and modify the traffic signal phasing to include a northbound right-turn overlap phase.

- **15. Mitchell Road/Clinton Keith Road** – Modify the traffic signal phasing to include protected plus permitted phasing at the Clinton Keith Road eastbound and westbound approaches.

- **16. I-215 Northbound Ramps/Clinton Keith Road** – At the northbound I-215 Off-ramp approach, add a dedicated left-turn lane, resulting in the approach lane configuration of one left-turn lane, one shared left-turn/right-turn lane, and one right-turn lane.

- **17. Whitewood Road/Clinton Keith Road** – No feasible improvements identified, significant unavoidable impact.

- **20. Whitewood Road/Baxter Road** - Modify the traffic signal phasing to include a southbound right-turn overlap phase.

- **21. Warm Springs Parkway/Linnel Lane** - Modify the traffic signal phasing to include a southbound right-turn overlap phase.

- **23. Winchester Road (SR-79)/Clinton Keith Road -** Modify the traffic signal phasing to include an eastbound right-turn overlap phase.

Exhibit 4.2-7 (Figure 8-1 in the TIA) shows the potential lane configuration or signal phasing improvements as described.

Table 4.2-12 summarizes the future year 2035 with project peak hour LOS at the study intersections with implementation of the potential improvements. As shown in Table 4.2-12, with the potential improvements, traffic operations at most of the intersections are forecast to improve to either acceptable conditions (LOS D or better) or to a level considered less than significant (below “without project” levels). However, at the following intersections, feasible improvements were not identified, or feasible improvement measures did not result in improved delays to below “without project” levels:

- Jefferson Avenue/Kalmia Street;
- Winchester Road (SR-79)/Murrieta Hot Springs Road;
- Hancock Avenue/Los Alamos Road;
- Whitewood Road/Murrieta Hot Springs Road; and
- Whitewood Road/Clinton Keith Road.

Table 4.2-12: Future Year 2035 With Project With Potential Improvements Intersection Peak Hour Level of Service

Intersection		Future Year 2035 Without Project				Future Year 2035 With Project With Potential Improvements				Change in AM Delay (sec)	Change in PM Delay (sec)	Significant Impact?
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour				
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS			
1	Jefferson Ave/Murrieta Hot Springs Rd	**97.6**	**F**	**126.5**	**F**	**66.7**	**E**	**111.4**	**F**	-30.9	-15.1	No
2	Madison Ave/Murrieta Hot Springs Rd	46.9	D	**99.2**	**F**	53.6	D	**91.7**	**F**	6.7	-7.5	No
4	Winchester Rd (SR-79)/Scott Rd	50.3	D	**156.1**	**F**	46.4	D	**103.5**	**F**	-3.9	-52.6	No
6	Warm Springs Pkwy/Baxter Rd	**67.1**	**E**	52.7	D	**60.3**	**E**	53.0	D	-6.8	0.3	No
7	California Oaks Rd/Clinton Keith Rd	44.5	D	**63.7**	**E**	38.0	D	37.1	D	-6.5	-26.6	No
8	Jefferson Ave/Kalmia St	**58.7**	**E**	50.3	D	**87.0**	**F**	**56.4**	**E**	28.3	6.1	**Yes**
9	Winchester Rd (SR-79)/Murrieta Hot Springs Rd	No feasible Improvements										**Yes**
10	Hancock Ave/Los Alamos Rd	No feasible Improvements										**Yes**
12	Whitewood Rd/Murrieta Hot Springs Rd	**96.1**	**F**	**143.9**	**F**	**111.4**	**F**	**136.2**	**F**	15.3	-7.7	**Yes**
13	Nutmeg St/Clinton Keith Rd	30.7	C	32.2	C	37.9	D	32.6	C	7.2	0.4	No
15	Mitchell Rd/Clinton Keith Rd	34.9	C	34.7	C	54.2	D	52.9	D	19.3	18.2	No
16	I-215 NB Ramps/Clinton Keith Rd	35.1	D	36.6	D	30.3	C	25.6	C	-4.8	-11.0	No
17	Whitewood Rd/Clinton Keith Rd	No feasible Improvements										**Yes**
20	Whitewood Rd/Baxter Rd	25.6	C	**58.8**	**E**	21.7	C	54.2	D	-3.9	-4.6	No
21	Warm Springs Pkwy/Linnel Ln	16.9	B	29.0	C	21.3	C	29.5	C	4.4	0.5	No
23	Winchester Rd (SR-79)/Clinton Keith Rd	**93.5**	**F**	**101.9**	**F**	38.5	D	35.8	D	-55.0	-66.1	No

Notes: LOS = Level of Service.

Roadway Segments:

Based on the results of the traffic impact analysis, 7 segments are forecast to be impacted as a result of the proposed Project's land use modifications. Potential improvements to roadway segment operations are limited to roadway widening to increase capacity (as opposed to intersection improvements that include less impactful measures such as signal phasing modifications). Thus, roadway segment improvements are not considered to be feasible.

Impact Conclusions:

Intersections:

With the potential improvements, traffic operations at most of the intersections are forecast to improve to either acceptable conditions (LOS D or better) or to a level considered less substantial (below "without project" levels). However, at the following intersections, feasible improvements were not identified, or improvement measures did not result in improved delays to below "without project" levels. Therefore, even with installation of the recommended

improvements, implementation of the proposed Project would result in unavoidable traffic impacts at the following intersections:

- Jefferson Avenue/Kalmia Street
- Winchester Road (SR-79)/Murrieta Hot Springs Road
- Hancock Avenue/Los Alamos Road
- Whitewood Road/Murrieta Hot Springs Road
- Whitewood Road/Clinton Keith Road

Roadway Segments:

As discussed above, based on the results of the traffic impact analysis, seven (7) segments are forecast to be impacted as a result of the proposed Project's land use modifications. Potential improvements to roadway segment operations are limited to roadway widening to increase capacity (as opposed to intersection improvements that include less impactful measures such as signal phasing modifications). Thus, roadway segment improvements are not considered to be feasible. Therefore, implementation of the proposed Project would result in diminished levels of service at the following roadway segments:

- Clinton Keith Road east of California Oaks Road
- California Oaks Road south of Clinton Keith Road
- Jefferson Avenue south of California Oaks Road;
- Los Alamos Road between Monroe Avenue and Hancock Avenue
- Murrieta Hot Springs Road between I-15 and I-215
- Murrieta Hot Springs Road between Alta Murrieta Drive and Whitewood Road
- Murrieta Hot Springs Road between Whitewood Road and Margarita Road

IMPLEMENTATION OF THE PROPOSED PROJECT COULD INCREASE HAZARDS DUE TO A GEOMETRIC DESIGN FEATURE OR INCOMPATIBLE USES.

Level of Significance Before Mitigation: Less Than Significant Impact.

Impact Analysis: The 2011 Certified EIR (Section 4.7 Traffic and Circulation) determined that future development pursuant to the 2011 General Plan would not result in inadequate design features or incompatible uses. Through the City's development review process, future developments would be evaluated to determine the appropriate land use permit for authorizing their use and the conditions for their establishment and operation. Additionally, future development projects would be evaluated on a case-by-case basis to ensure that adequate access and circulation to and within the development would be provided. Access to development sites would be required to comply with all City design standards and would be reviewed by the City and the Murrieta Fire & Rescue (MFR) to ensure that inadequate design features or incompatible uses do not occur. The City and the MFR would review future development in order to ensure that they are designed to meet adopted standards and provide adequate emergency access. At a minimum, compliance with relevant Code standards would be required. The 2011 Certified EIR determined that implementation of the 2011 General Plan would not substantially increase hazards due to design feature or incompatible uses. A less than significant impact would occur in this regard. The 2011 Certified EIR also determined that

the 2011 General Plan includes goals and policies (CIR-1; CIR-1.1 – CIR-1.14; CIR-2; CIR-2.1 – CIR-2.14; CIR-3; CIR-3.1 – CIR-3.5; CIR-4; CIR-4.1 – CIR-4.3; CIR-5; CIR-5.1 - CIR-5.14; CIR-6; CIR-6.1 – CIR-6.14; CIR-7; CIR-7.1 – CIR-7.8; CIR-8; CIR-8.1 – CIR-8.15; LU-3; LU-3.2; LU-23; LU-23.2; AQ-5; AQ-5.1 – AQ 5.7; N-3; N-3.4; SAF-11; SAF-11.1.) ensure that new development, including infrastructure would not result in incompatible uses, that the street system is designed efficiently to reduce potential impacts to residential neighborhoods, and that potential impacts associated with various transportation modes utilizing the same roadway system would be reduced to less than significant levels.

The proposed Project does not change the potential impacts discussed in the 2011 Certified EIR. Future development pursuant to the proposed Project may result in development of the same land that was analyzed in the 2011 Certified EIR with the same potential impacts. As mentioned above, the City's development review process and 2011 General Plan goals and policies, as well as the revised or new policies of the proposed General Plan 2035 Update (CIR-3.5, CIR-3.6, CIR-6.15 and CIR-7.9) as discussed in Section 3.0 (Project Description) ensure that new development, including infrastructure would not result in incompatible uses, that the street system is designed efficiently to reduce potential impacts to residential neighborhoods, and that potential impacts associated with various transportation modes utilizing the same roadway system would be reduced to less than significant levels. Therefore, no new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the 2011 Certified EIR. Thus, the proposed Project is consistent with the impacts identified in the 2011 Certified EIR and the level of impact (less than significant) remains unchanged from that cited in the 2011 Certified EIR.

Mitigation Measures: Not Applicable.

Level of Significance After Mitigation: Not Applicable.

EMERGENCY ACCESS

IMPLEMENTATION OF THE PROPOSED PROJECT COULD RESULT IN INADEQUATE EMERGENCY ACCESS.

Level of Significance Before Mitigation: Less Than Significant Impact.

Impact Analysis: The 2011 Certified EIR (Section 4.7 Traffic and Circulation) determined that future development projects would be required to comply with the City's development review process including review for compliance with the City's Development Code. New developments associated with implementation of the 2011 General Plan would be required to comply with all applicable fire code and ordinance requirements for construction and access to the site. Individual projects would be reviewed by the MFR to determine the specific fire requirements applicable to the specific development and to ensure compliance with these requirements. This would ensure that new developments would provide adequate emergency access to and from the site. Further, the City and the MFR would review any modifications to existing roadways to ensure that adequate emergency access or emergency response would be maintained. Additionally, emergency response and evacuation procedures would be coordinated through the

City in coordination with the police and fire departments, resulting in less than significant impacts.

The proposed Project does not change the potential impacts discussed in the 2011 Certified EIR. Future development pursuant to the proposed Project may result in development of the same land that was analyzed in the 2011 Certified EIR with the same potential impacts to emergency access. The City's development review process and 2011 General Plan goals and policies as well as the revised or new policies of the proposed General Plan 2035 Update (as mentioned above) ensure that new developments would provide adequate emergency access to and from the site. Therefore, no new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the 2011 Certified EIR. Thus, the proposed Project is consistent with the impacts identified in the 2011 Certified EIR and the level of impact (less than significant) remains unchanged from that cited in the 2011 Certified EIR.

Mitigation Measures: Not Applicable

Level of Significance After Mitigation: Not Applicable

CEQA GUIDELINES SECTION 15064.3 (B)

☐ IMPLEMENTATION OF THE PROPOSED PROJECT COULD CONFLICT WITH CEQA GUIDELINES SECTION 15064.3 (b).

Level of Significance Before Mitigation: Less Than Significant Impact.

Impact Analysis: The City of Murrieta has the discretion (per CEQA Guidelines section 15064.3) to choose the most appropriate methodology to evaluate a project's VMT, including whether to express the change in absolute terms, per capita, per household or in any other measure; in addition, the City of Murrieta may use models to estimate a project's VMT and may revise those estimates to reflect professional judgment based on substantial evidence. For the purposes of this General Plan Update, a decrease in VMT compared to the 2011 General Plan should be presumed to have a less than significant transportation impact.

VRPA Technologies (VRPA) reviewed the VMT results from the transportation model prepared for the proposed Focused Murrieta General Plan Update by Iteris. VRPA concluded that revisions are needed in the calculations in order to obtain accurate VMT results for the 2011 General Plan scenario and the proposed Focused General Plan Update scenario. Although the transportation model was prepared using typical modeling procedures, VRPA concluded that the model was not able to accurately account for the following situations that are important in the VMT analysis:

- In the 2011 General Plan, the model assumes buildout of Office and Research Park and Business Park land uses. In reality, it is doubtful that buildout of these land uses could occur given market conditions. In fact, of the underlying considerations in the General Plan update was the need to better balance employment land use with the market for development of employment-related facilities.

- In the proposed Focused General Plan Update scenario, there are plans for development of an employment-related innovation center and associated residential units that will be oriented toward employees of the innovation center. The transportation model does not have a way to accurately model the transportation characteristics of these units.

VRPA prepared a memo (VRPA Memo GPU/VMT Analysis, August 16, 2019, Appendix G) which provides adjustments to the VMT analysis calculations to account for these two conditions. These adjustments are explained below.

ADJUSTMENT FOR EMPLOYMENT-RELATED LAND USES

Due to the high numbers of residents of southern Riverside County who commute to other counties, each employee added in Murrieta reduces VMT as residents of southern Riverside County who formerly commuted long distances now have the opportunity to be employed closer to where they live. As described above, the 2011 General Plan scenario assumed more employees in Murrieta than would actually occur due to market conditions. The revision to the VMT analysis to account for this change is to calculate the increase in VMT that would occur if fewer employees were located in Murrieta. The first step is to calculate the number of employees assumed in the model that would not actually be located in Murrieta. This value is called “excess employees” in the calculation. The proposed calculation is as follows:

Increase in Daily VMT = Excess Employees x Average Daily Trips per Employee x (Average Trip Length to External County Job Location – Average Trip Length to Murrieta Job Location)

ADJUSTMENT FOR RESIDENTIAL UNITS ORIENTED TOWARD INNOVATION

In the proposed Focused General Plan Update, additional multi-family residential units are proposed to be oriented toward an employment area, the Innovation land use designation. The residential units would be located in close proximity to job opportunities and trips would be expected to be made by walking, bicycling, or short vehicle trips. From the transportation model’s point of view, the residential units oriented toward the Innovation area would be treated as typical residential units in Murrieta with a typical commute distance for a resident commuting to a job in an external County. The proposed VMT adjustment to take this into account would be to determine the increase in VMT that would occur if these residential units were oriented toward a typical employment location. The proposed calculation is as follows:

Increase in Daily VMT = Residential Units Oriented Toward Innovation Center x Average Daily Employment Trips per Unit x (Average Trip Length to External County Job Location – Average Trip Length to Innovation Center)

Table 4.2-13 shows the total daily Citywide VMT for both the 2011 General Plan and the proposed Project. VMT under the proposed Project is less than the 2011 General Plan in each of the analysis years depicted in Table 4.2-13. In addition, the daily 2035 VMT per capita in the 2011 General Plan is 43.2 which is higher than the proposed Project’s daily 2040 VMT per capita of 41.1. The proposed General Plan Update’s VMT is decreasing when compared to the

2011 General Plan. Therefore, the proposed Project has a less than significant transportation impact with respect to VMT.

Table 4.2-13: Total Daily Citywide Vehicle Miles Travelled (VMT)

Analysis Year	Scena		
	2011 General Plan (Existing)	Proposed General Plan Update	Net Change
2016 (Base)	4,136,700	4,132,649	-4,051
2020	4,442,413	4,419,630	-22,783
2030	5,206,697	5,137,080	-69,617
2035 (General Plan Update Horizon Year	5,588,834	5,495,806	-93,028
2040 (Regional Transportation Model Horizon Year)	5,970,980	5,854,532	-116,448

Note: VMT totals calculated using origin-destination method

Mitigation Measures: Not Applicable

Level of Significance After Mitigation: Not Applicable

4.2.5 Cumulative Impacts and Mitigation Measures

- **DEVELOPMENT ASSOCIATED WITH IMPLEMENTATION OF THE PROPOSED PROJECT AND CUMULATIVE DEVELOPMENT COULD RESULT IN CUMULATIVELY CONSIDERABLE TRAFFIC AND CIRCULATION IMPACTS.**

Level of Significance Before Mitigation: Significant Impact.

Impact Analysis:

As discussed, the traffic forecasting approach involved the development of a focused multi-modal, multi-class travel demand model for the City of Murrieta. This focused model is consistent with the 2016 SCAG RTP/SCS travel demand model assumptions and inputs as well as compatible with the current City of Murrieta Transportation Analysis Zone (TAZ) structure and land use as part of the adopted 2011 General Plan. The base year of 2016 and the forecast year of 2040 were obtained from the 2016 SCAG RTP/SCS travel demand model. The model was developed using the TransCAD software package, the software platform currently used by SCAG for regional modeling. The City's highway network was updated and refined to include all key general plan roadways in the City of Murrieta. The transit network was also

reviewed and found to be a satisfactory representation of transit services. The model is consistent with the traditional four step modeling process, which includes trip generation, trip distribution, mode split, and traffic assignment.

With the potential improvements, traffic operations at most of the intersections are forecast to improve to LOS D or better, or to a level considered less than significant (below "without project" levels). However, at five (5) intersections, feasible improvements were not identified, or feasible improvement measures did not result in improved delays to below "without project" levels. In addition, seven (7) roadway segments are forecast to operate at LOS D, E, or F. Potential improvements to roadway segment operations are limited to roadway widening to increase capacity (as opposed to intersection improvements that include less impactful measures such as signal phasing modifications). Thus, roadway segment improvements are not considered to be feasible. Therefore, buildout of the proposed Project would result in cumulatively considerable traffic and circulation impacts.

Mitigation Measures: No mitigation measures beyond the goals and policies identified in the 2011 and/or proposed Project referenced above are available.

Level of Significance After Mitigation:

Roadway Segments: Significant Unavoidable Impact for the seven (7) roadway segments identified as LOS D, E, or F listed in table 4.2-11 above. Less Than Significant Impact for all other studied roadway segments identified as LOS A, B, or C on table 4.2-11 above.

Intersections: Significant Unavoidable Impacts for the five (5) intersections identified in Table 4.2-10 above. Less Than Significant Impact for all other studied intersections.

4.2.6 Significant Unavoidable Impacts

The proposed Project would result in a significant unavoidable impact for the following areas for both project and cumulative impacts:

Intersections:
Even with installation of the recommended improvements, implementation of the proposed General Plan would result in unavoidable traffic impacts at the following five (5) intersections:

- Jefferson Avenue/Kalmia Street
- Winchester Road (SR-79)/Murrieta Hot Springs Road
- Hancock Avenue/Los Alamos Road
- Whitewood Road/Murrieta Hot Springs Road
- Whitewood Road/Clinton Keith Road

Roadway Segments:
Implementation of the proposed General Plan would result in unavoidable traffic impacts at the following seven (7) roadway segments:

- Clinton Keith Road east of California Oaks Road
- California Oaks Road south of Clinton Keith Road
- Jefferson Avenue south of California Oaks Road

- Los Alamos Road between Monroe Avenue and Hancock Avenue
- Murrieta Hot Springs Road between I-15 and I-215
- Murrieta Hot Springs Road between Alta Murrieta Drive and Whitewood Road
- Murrieta Hot Springs Road between Whitewood Road and Margarita Road

All other traffic and circulation impacts associated with implementation of the proposed Project would be less than significant by adherence to and/or compliance with goals and policies referenced above in section 4.7.4.

4.2.7 Sources Cited

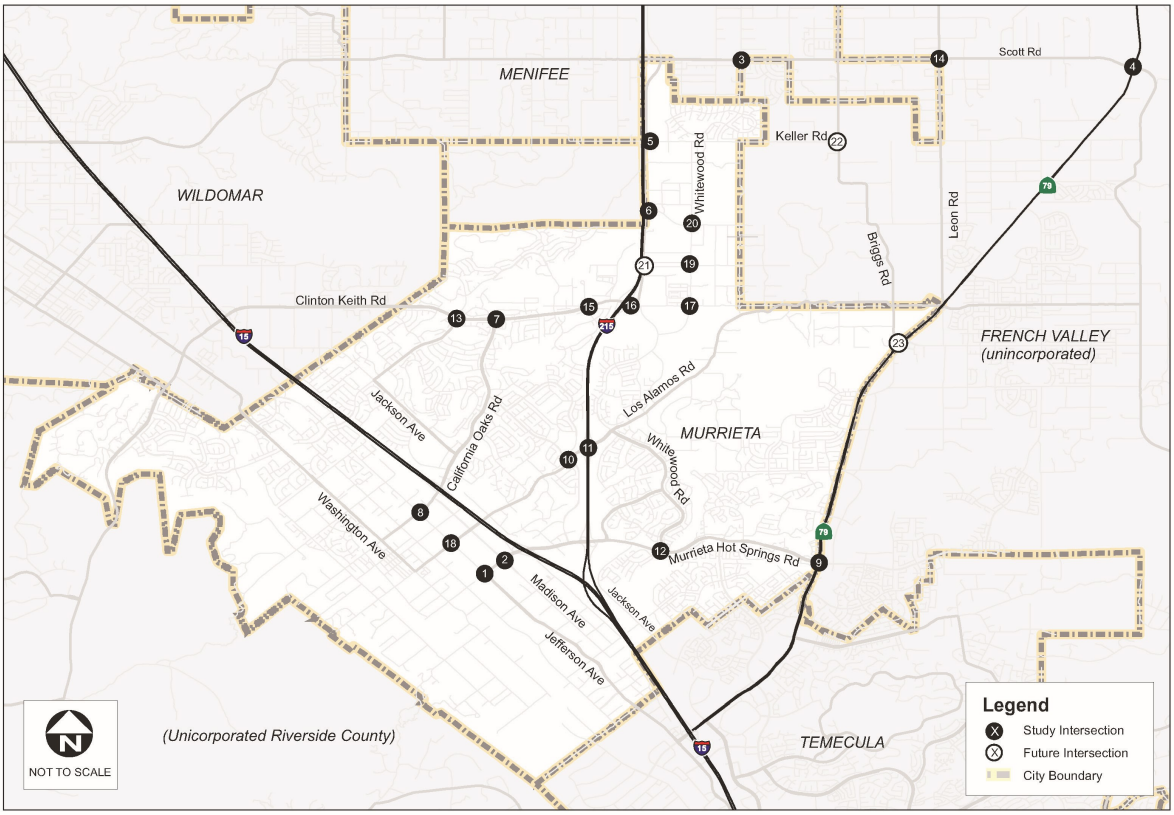
City of Murrieta Final General Plan EIR, 2011.

City of Murrieta General Plan, 2011.

Iteris, *Traffic Impact Analysis*, August 21, 2019.

2019 CEQA Statue and Guidelines

VRPA, Memo, Murrieta General Plan Update VMT Analysis, August 16, 2019



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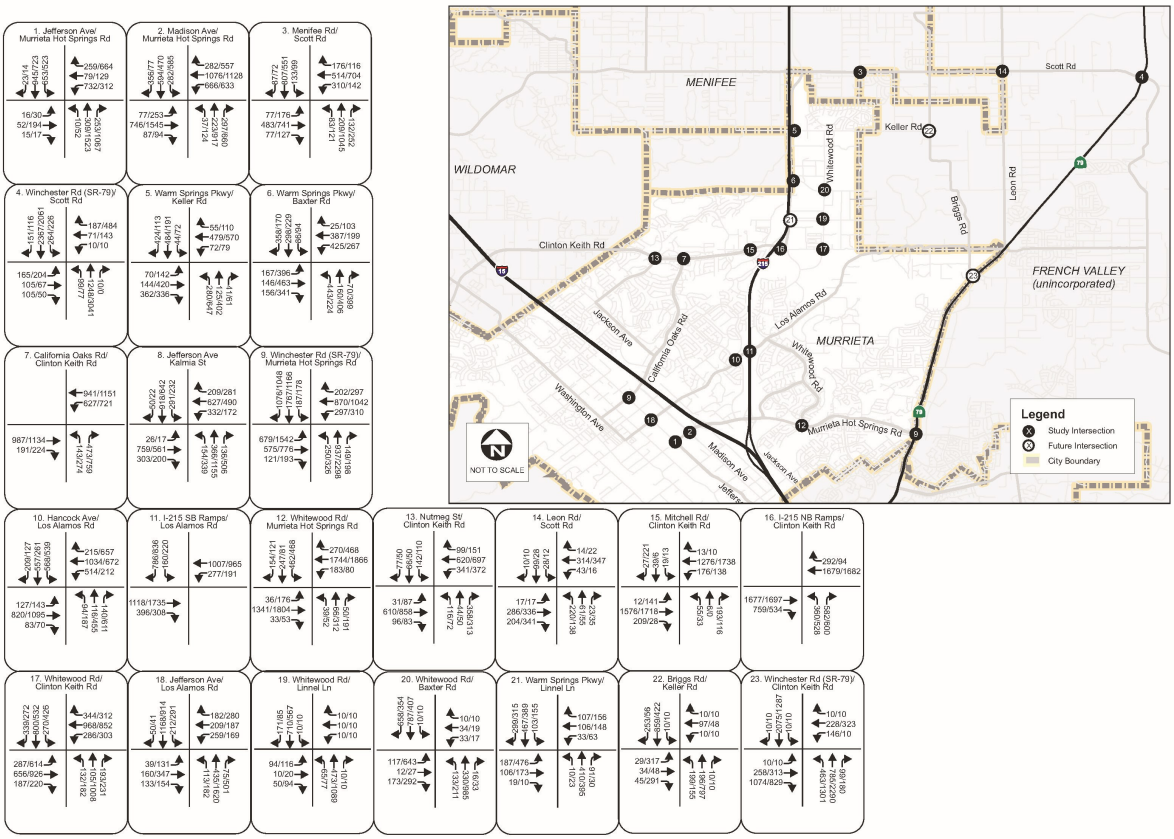
Focused General Plan Update
Traffic Impact Analysis

Study Intersections

Exhibit 4.2-1



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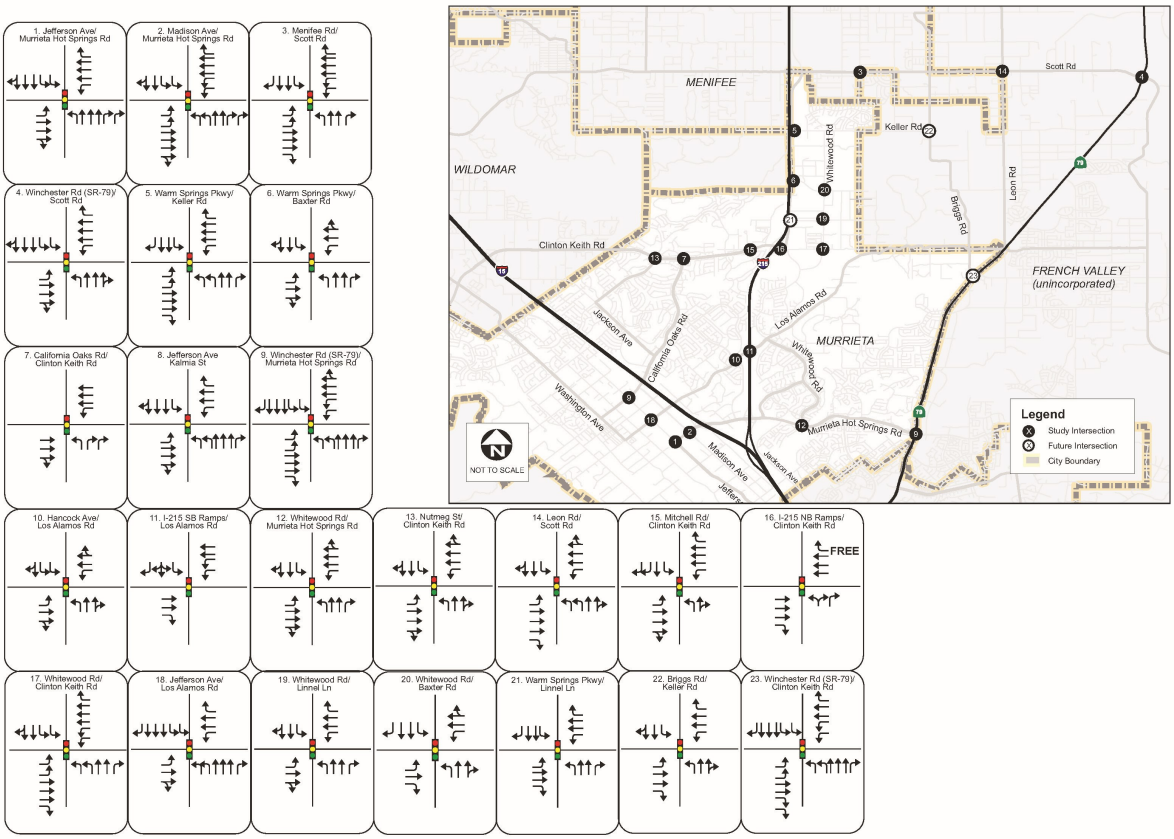
Traffic Impact Analysis

Future Year 2035 Without Project Intersection Volumes

Exhibit 4.2-2



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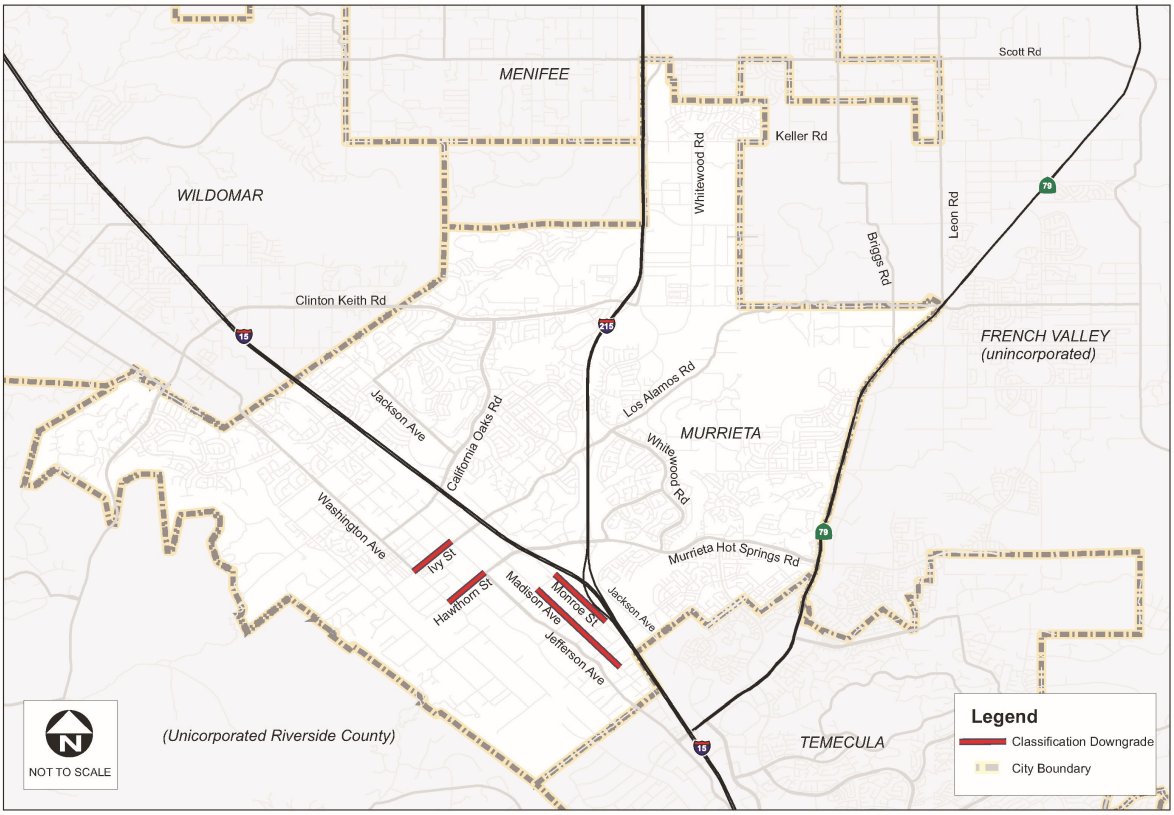
Focused General Plan Update
Traffic Impact Analysis

Future Year 2035 Without Project Intersection Lane Configurations

Exhibit 4.2-3



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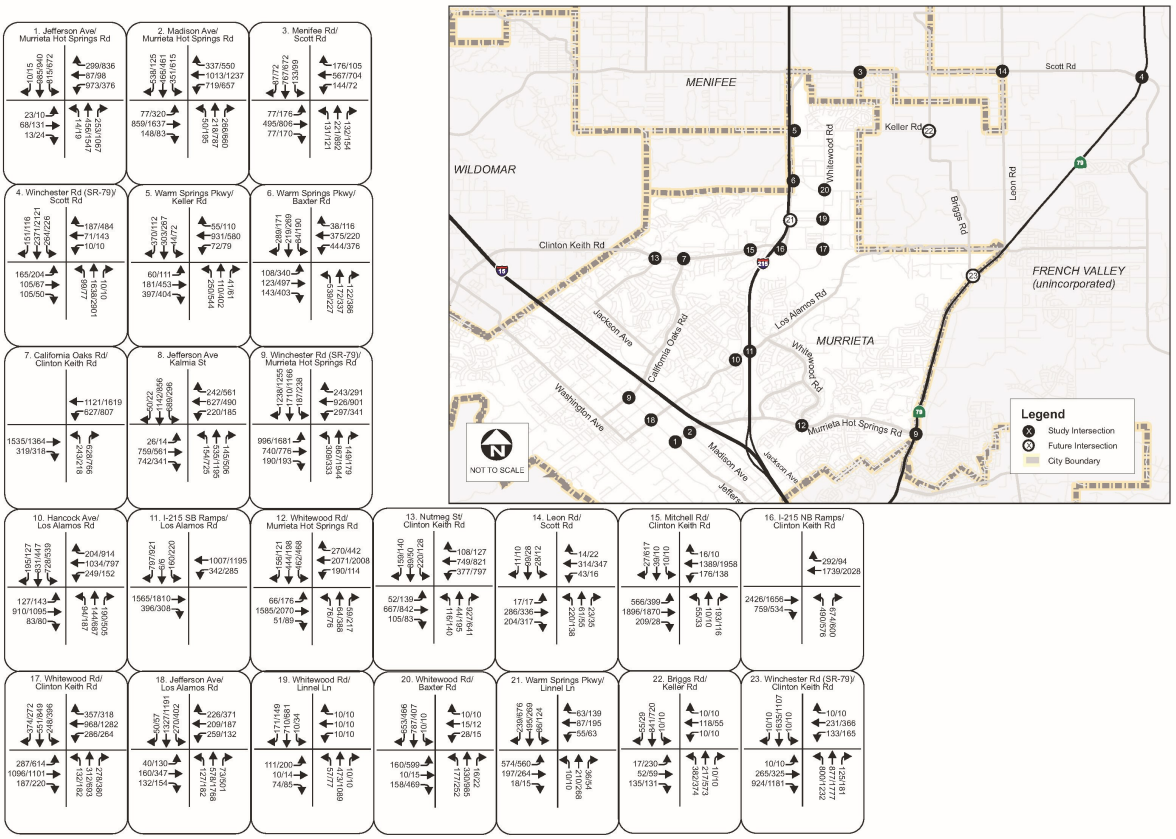
Traffic Impact Analysis

Roadway Classification Downgrade Locations

Exhibit 4.2-4



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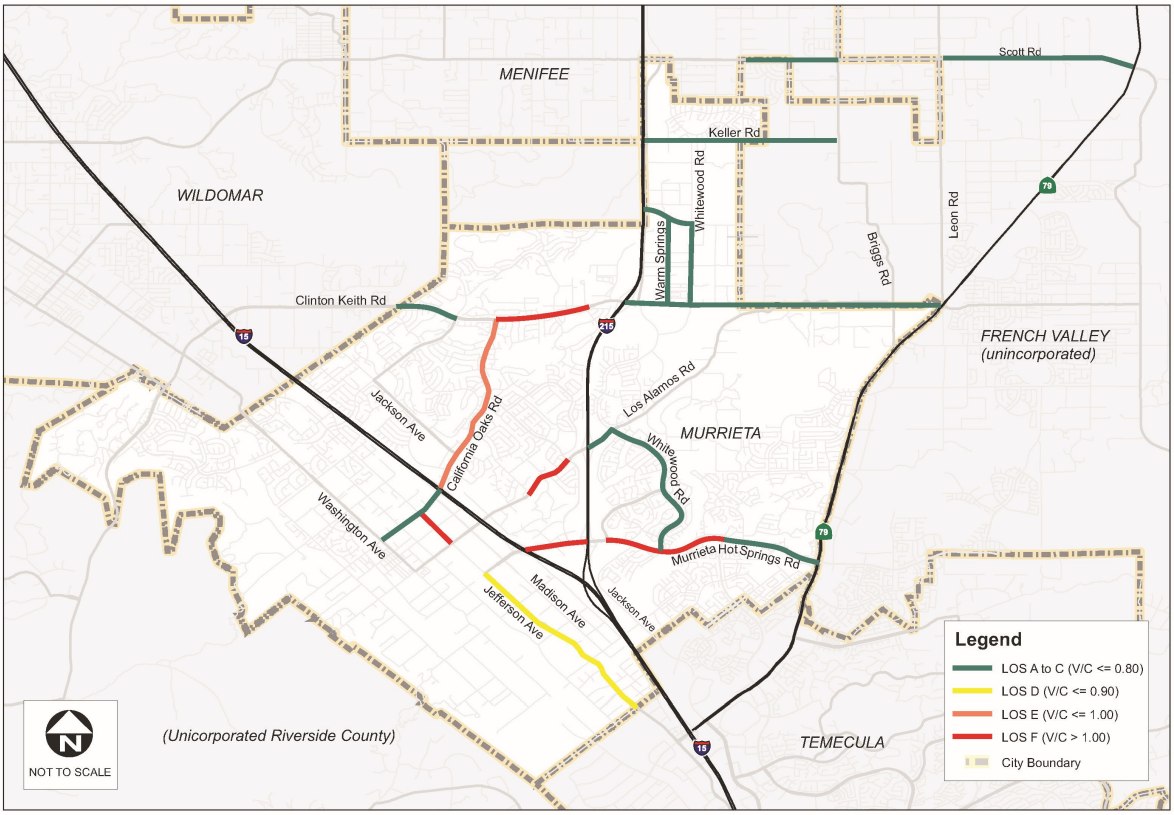
City of Murrieta
Focused General Plan Update
Traffic Impact Analysis

Future Year 2035 With Project Intersection Volumes

Exhibit 4.2-5



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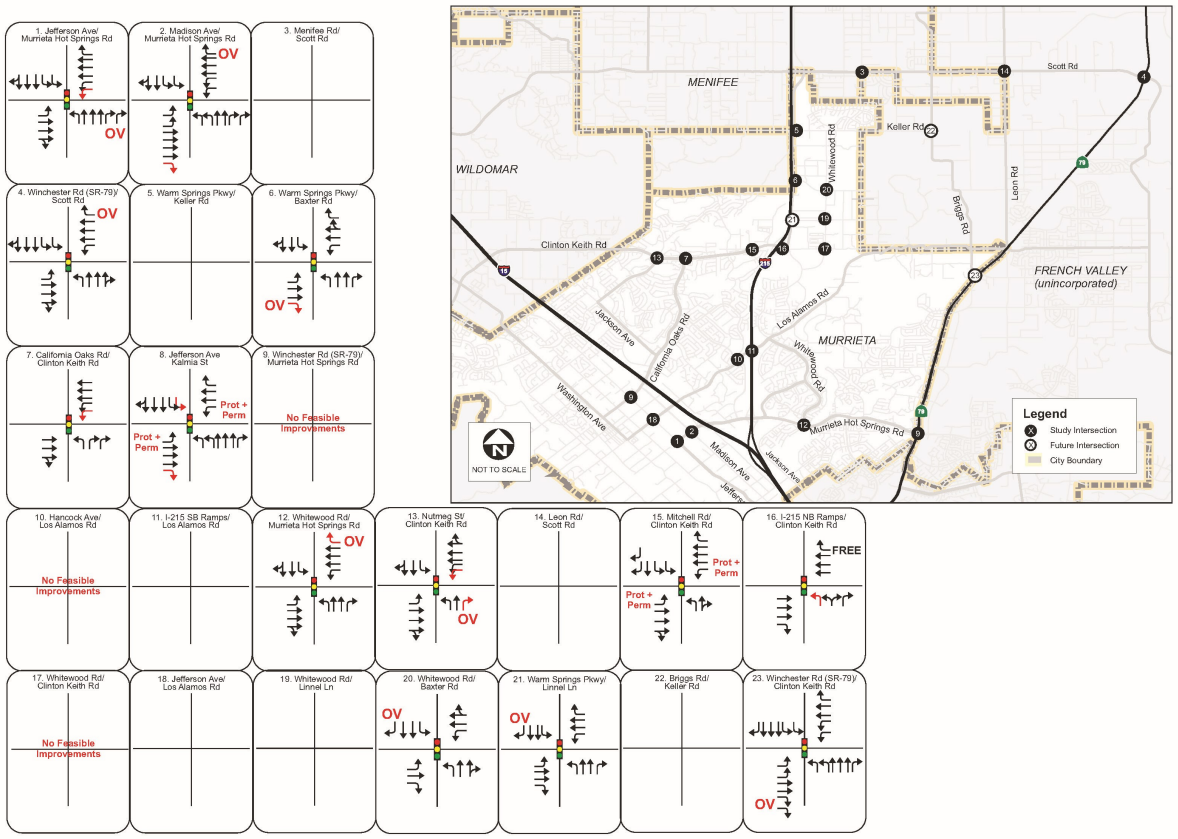
Traffic Impact Analysis

Future Year 2035 With Project Roadway Segment LOS

Exhibit 4.2-6



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Focused General Plan Update
Traffic Impact Analysis

Potential Intersection Improvements
Exhibit 4.2-7

4.3 Air Quality

This section identifies and analyzes the potential air quality impacts associated with the proposed Project. The information and analysis in this document are organized in accordance with the checklist in Appendix G of the California Environmental Quality Act (CEQA) Guidelines and current State and local guidance. Refer to Appendix C, Tech Memo: Air Quality and Greenhouse Gas Analysis, prepared by Ascent 2/14/2020, for the assumptions used in this analysis.

4.3.1 Regulatory Framework

The following federal, State, and local regulations have been added or updated since certification of the 2011 General Plan EIR.

FEDERAL

The U.S. Environmental Protection Agency (EPA) has been charged with implementing national air quality programs. EPA's air quality mandates are drawn primarily from the federal Clean Air Act (CAA), which was enacted in 1970. The most recent major amendments made by Congress were in 1990.

Criteria Air Pollutants

The CAA required EPA to establish the U.S. National Ambient Air Quality Standards (NAAQS). As shown in Table 4.3-1, EPA has established primary and secondary NAAQS for the following criteria air pollutants: ozone, carbon monoxide (CO), nitrogen dioxide (NO2), sulfur dioxide (SO2), particulate matter with an aerodynamic diameter of 10 microns or less (PM10), particulate matter with an aerodynamic diameter of 2.5 microns or less (PM2.5), and lead. The primary standards protect the public health and the secondary standards protect public welfare. The CAA also requires each state to prepare a State Implementation Plan (SIP) for attaining and maintaining the NAAQS. The federal Clean Air Act Amendments of 1990 added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. Individual SIPs are modified periodically to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. EPA is responsible for reviewing all SIPs to determine whether they conform to the mandates of the CAA and its amendments, and whether implementation will achieve air quality goals. If EPA determines a SIP to be inadequate, a federal implementation plan that imposes additional control measures may be prepared for the nonattainment area. If an approvable SIP is not submitted or implemented within the mandated time frame, sanctions may be applied to transportation funding and stationary air pollution sources in the air basin.

Table 4.3-1
National and California Ambient Air Quality Standards

Pollutant	Averaging Time	California (CAAQS)[a,b]	National (NAAQS)[c]	
			Primary[b,d]	Secondary[b,e]
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m^3)	–[e]	Same as primary standard
	8 Hours	0.070 ppm (137 µg/m^3)	0.070 ppm (147 µg/m^3)	
Carbon monoxide (CO)	1-hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	Same as primary standard
	8-hour	9 ppmf (10 mg/m^3)	9 ppm (10 mg/m^3)	
Nitrogen dioxide (NO2)	Annual arithmetic mean	0.030 ppm (57 µg/m^3)	53 ppb (100 µg/m^3)	Same as primary standard
	1-hour	0.18 ppm (339 µg/m^3)	100 ppb (188 µg/m^3)	—
Sulfur dioxide (SO2)	24-hour	0.04 ppm (105 µg/m^3)	—	—
	3-hour	—	—	0.5 ppm (1300 µg/m^3)
	1-hour	0.25 ppm (655 µg/m^3)	75 ppb (196 µg/m^3)	—
Respirable particulate matter (PM10)	Annual Arithmetic Mean	20 µg/m^3	—	Same as primary standard
	24-hour	50 µg/m^3	150 µg/m^3	
Fine particulate matter (PM2.5)	Annual arithmetic mean	12 µg/m^3	12.0 µg/m^3	15.0 µg/m^3
	24-hour	—	35 µg/m^3	Same as primary standard
Lead f	Calendar quarter	—	1.5 µg/m^3	Same as primary standard
	30-Day average	1.5 µg/m^3	—	—
	Rolling 3-Month Average	–	0.15 µg/m^3	Same as primary standard
Hydrogen sulfide	1-hour	0.03 ppm (42 µg/m^3)	**No national standards**	
Sulfates	24 Hour	25 µg/m^3		
Vinyl chloride f	24-hour	0.01 ppm (26 µg/m^3)		
Visibility-reducing particulate matter	8-hour	Extinction of 0.23 per km		

Notes: μg/m^3 = micrograms per cubic meter; km = kilometers; ppb = parts per billion; ppm = parts per million (by volume).

a. California standards for ozone, carbon monoxide, SO_2 (1- and 24-hour), NO_2, particulate matter, and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
b. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based on a reference temperature of 25 degrees Celsius (°C) and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
c. National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic means) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over three years, is equal to or less than the standard. The PM_{10} 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 μg/m^3 is equal to or less than one. The $PM_{2.5}$ 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.
d. National primary standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
e. National secondary standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
f. The California Air Resources Board has identified lead and vinyl chloride as toxic air contaminants with no threshold of exposure for adverse health effects determined. This allows for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

Source: EPA 2016 and CARB 2016a

Toxic Air Contaminants/Hazardous Air Pollutants

Toxic Air Contaminants (TACs), or in federal parlance, hazardous air pollutants (HAPs) are a defined set of airborne pollutants that may pose a present or potential hazard to human health. A TAC is defined as an air pollutant that may cause or contribute to an increase in mortality or in serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air; however, their high toxicity or health risk may pose a threat to public health even at low concentrations.

A wide range of sources, from industrial plants to motor vehicles, emit TACs. The health effects associated with TACs are quite diverse and generally are assessed locally, rather than regionally. TACs can cause long-term health effects such as cancer, birth defects, neurological damage, asthma, bronchitis or genetic damage; or short-term acute affects such as eye watering, respiratory irritation (a cough), running nose, throat pain, and headaches.

For evaluation purposes, TACs are separated into carcinogens and non-carcinogens based on the nature of the physiological effects associated with exposure to the pollutant. Carcinogens are assumed to have no safe threshold below which health impacts would not occur. This contrasts with criteria air pollutants, for which acceptable levels of exposure can be determined and for which ambient standards have been established (See Table 1 of Appendix C). Cancer risk from TACs is expressed as excess cancer cases per one million exposed individuals, typically over a lifetime of exposure.

EPA and CARB regulate HAPs and TACs, respectively, through statutes and regulations that generally require the use of the maximum achievable control technology or best available control technology (BACT) for toxics to limit emissions.

STATE

TACs in California are regulated primarily through the Tanner Air Toxics Act (Assembly Bill [AB] 1807, Chapter 1047, Statutes of 1983) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (Hot Spots Act) (AB 2588, Chapter 1252, Statutes of 1987). AB 1807 sets forth a formal procedure for CARB to designate substances as TACs. Research, public participation, and scientific peer review are required before CARB can designate a substance as a TAC. To date, CARB has identified more than 21 TACs and adopted EPA's list of HAPs as TACs. Most recently, PM exhaust from diesel engines (diesel PM) was added to CARB's list of TACs.

After a TAC is identified, CARB then adopts an airborne toxics control measure for sources that emit that particular TAC. If a safe threshold exists for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If no safe threshold exists, the measure must incorporate BACT for toxics to minimize emissions.

The Hot Spots Act requires that existing facilities that emit toxic substances above a specified level prepare an inventory of toxic emissions, prepare a risk assessment if emissions are significant, notify the public of significant risk levels, and prepare and implement risk reduction measures.

CARB has adopted diesel PM control measures and more stringent emissions standards for various transportation-related mobile sources of emissions, including transit buses, and off-road diesel equipment (e.g., tractors, generators). Over time, the replacement of older vehicles will result in a vehicle fleet that produces substantially lower levels of TACs than under current conditions. Mobile-source emissions of TACs (e.g., benzene, 1-3-butadiene, diesel PM) have been reduced significantly over the last decade and will be reduced further in California through a progression of regulatory measures (e.g., Low Emission Vehicle/Clean Fuels and Phase II reformulated gasoline regulations) and control technologies. With implementation of CARB's Risk Reduction Plan, it is expected that diesel PM concentrations will be 85 percent less in 2020 in comparison to year 2000 (CARB 2000). Adopted regulations are also expected to continue to reduce formaldehyde emissions emitted by cars and light-duty trucks. As emissions are reduced, it is expected that risks associated with exposure to the emissions will also be reduced.

LOCAL

South Coast Air Quality Management District

SCAQMD is the primary agency responsible for planning to meet NAAQS and CAAQS in the South Coast Air Basin (SCAB). SCAQMD periodically updates the Air Quality Management Plan (AQMP) which is submitted to be included in the State SIP (SCAQMD 2017). The SIP is a compilation of plans and regulations that govern how the

region and State will comply with the CAA requirements to attain and maintain the NAAQS for ozone and $PM_{2.5}$.

Criteria Air Pollutants

SCAQMD has developed a set of guidelines for use by lead agencies when preparing environmental documents. The guidelines contain thresholds of significance for criteria pollutants and TACs, and also make recommendations for conducting air quality analyses. After SCAQMD guidelines have been consulted and the air quality impacts of a project have been assessed, the lead agency's analysis undergoes a review by SCAQMD who submits comments and suggestions to the lead agency for incorporation into the environmental document.

All projects under the proposed Project would be subject to adopted SCAQMD rules and regulations in effect at the time of construction. Specific rules applicable to the construction of land uses anticipated under the proposed Project may include but are not limited to the following:

- **Regulation II, Rule 201:** Permit to Construct. A person shall not build, erect, install, alter, or replace any equipment permit unit, the use of which may cause the issuance of air contaminants or the use of which may eliminate, reduce, or control the issuance of air contaminants without first obtaining written authorization for such construction from the Executive Officer. A permit to construct shall remain in effect until the permit to operate the equipment for which the application was filed as granted or denied, or the application is canceled.

- **Regulation II, Rule 203:** Permit to Operate. A person shall not operate or use any equipment permit unit, the use of which may cause the issuance of air contaminants, or the use of which may reduce or control the issuance of air contaminants, without first obtaining a written permit to operate from the Executive Officer.

- **Regulation IV, Rule 402:** Nuisance. A person shall not discharge from any source whatsoever such quantities of air contaminants or other materials which cause injury, detriment, nuisance or annoyance to any considerable number of persons or the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause or have natural tendency to cause injury or damage to business or property.

- **Regulation IV, Rule 403:** Fugitive Dust. The developer or contractor is required to implement Best Available Control Measures for all sources, and all forms of visible PM are prohibited from crossing any property line.

- **Regulation XI, Rule 1113:** Architectural Coatings. The manufacturer, distributor, and end user of architectural and industrial maintenance coatings to reduce

volatile organic compounds (VOC) emissions from the use of these coatings, primarily by placing limits on the VOC content of various coating categories.

- **Regulation XII, Rule 1186:** PM10 Emissions from Paved and Unpaved Roads, and Livestock Operations. The purpose of this rule is to reduce the amount of PM entrained in the ambient air as a result of vehicular travel on paved and unpaved public roads.

- **Regulation XIII, Rule 1301:** New Source Review, General. The purpose of this rule is to set forth pre-construction review requirements for new, modified, or relocated facilities, to ensure that the operation of such facilities does not interfere with progress in attainment of the NAAQS, and that future economic growth within the SCAQMD is not unnecessarily restricted. The specific air quality goal of this regulation is to achieve no net increases from new or modified permitted sources of nonattainment air contaminants or their precursors.

- **Regulation XIV, Rule 1401:** New Source Review of Toxic Air Contaminants. The rule specifies limits for maximum individual cancer risk, cancer burden, and noncancer acute and chronic hazard index from new permit units, relocations, or modifications to existing permit units which emit toxic air contaminants.

- **Regulation XIV, Rule 1403:** Asbestos Emissions from Demolition/Renovation Activities. The owner or operator of any demolition or renovation activity is required to have an asbestos study performed prior to demolition and to provide notification to SCAQMD prior to commencing demolition activities.

Toxic Air Contaminants

At the local level, air districts may adopt and enforce CARB control measures for TACs. Under SCAQMD Rule 201 (“Permit to Construct”), Rule 203 (“Permit to Operate”), Rule 1301 (“New Source Review, General”), Rule 1401 (“New Source Review of Toxic Air Contaminants”), all sources that possess the potential to emit TACs are required to obtain permits from SCAQMD. Permits may be granted to operations the emit TACs if they are constructed and operated in accordance with applicable regulations, including New Source Review standards and air toxics control measures. SCAQMD limits emissions and public exposure to TACs through a number of programs. SCAQMD prioritizes TAC-emitting stationary sources based on the quantity and toxicity of the TAC emissions and the proximity of the facilities to sensitive receptors. Sensitive receptors are people, or facilities that generally house people (e.g., schools, hospitals, residences), that may experience adverse effects from unhealthful concentrations of air pollutants.

Odors

Although offensive odors rarely cause any physical harm, they can be very unpleasant, leading to considerable stress among the public and often generating citizen complaints

to local governments and SCAQMD. SCAQMD's Rule 402 (Nuisance) regulates odorous emissions.

Climate Action Plan

The City of Murrieta has initiated a Climate Action Plan (CAP) update because of several important changes that have occurred at the State and regional level since the 2011 CAP was prepared. Senate Bill (SB) 32, signed into law into 2016, established a statewide GHG reduction target of 40 percent below 1990 levels by 2030. In November 2017, the California Air Resources Board (CARB) published the 2017 Climate Change Scoping Plan (2017 Scoping Plan), which lays out the framework for achieving the 2030 target established by SB 32.

Additionally, the cities of Western Riverside County, through the Western Riverside Council of Governments (WRCOG) have established a common framework to allow for a commonality of regional climate action objectives known as the Subregional Climate Action Plan (Subregional CAP). The congruent CAP Update would make the City's CAP consistent with State GHG reduction targets and relevant guidance contained in the WRCOG Subregional CAP completed in September 2014.

The measures provided in the CAP update were primarily developed to reduce GHG emissions within the City of Murrieta, but they also result in benefits such as, improvements in traffic congestions, air quality, water supply, public health, and infrastructure.

4.3.2 Environmental Setting

The proposed Project site is located in the SCAB. The SCAB includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino counties. Existing air quality conditions in the area are determined by such natural factors as topography, meteorology, and climate, in addition to the amount of emissions released by existing air pollutant sources. However, regional air quality concentration data which has been updated since the 2011 General Plan EIR is discussed below.

Criteria Air Pollutants

Concentrations of criteria air pollutants are used to indicate the quality of the ambient air. Ozone, PM_{10}, and $PM_{2.5}$ are the criteria air pollutants of primary concern in this analysis due to their nonattainment status with respect to the applicable NAAQS and/or CAAQS in the SCAB. Brief descriptions of these key criteria air pollutants in the SCAB and their health effects are provided below. Emission source types and health effects are summarized in Table 4.3-2. The attainment status of each criteria air pollutant with respect to the NAAQS and the CAAQS in the SCAB is provided in Table 4.3-3.

Table 4.3-2
Sources and Health Effects of Criteria Air Pollutants

Pollutant	Sources	Acute[1] Health Effects	Chronic[2] Health Effects
Ozone	Secondary pollutant resulting from reaction of ROG and NOX in presence of sunlight. ROG emissions result from incomplete combustion and evaporation of chemical solvents and fuels; NOX results from the combustion of fuels	increased respiration and pulmonary resistance; cough, pain, shortness of breath, lung inflammation	permeability of respiratory epithelia, possibility of permanent lung impairment
Carbon monoxide (CO)	Incomplete combustion of fuels; motor vehicle exhaust	headache, dizziness, fatigue, nausea, vomiting, death	permanent heart and brain damage
Nitrogen dioxide (NO2)	combustion devices; e.g., boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines	coughing, difficulty breathing, vomiting, headache, eye irritation, chemical pneumonitis or pulmonary edema; breathing abnormalities, cough, cyanosis, chest pain, rapid heartbeat, death	chronic bronchitis, decreased lung function
Sulfur dioxide (SO2)	coal and oil combustion, steel mills, refineries, and pulp and paper mills	Irritation of upper respiratory tract, increased asthma symptoms	Insufficient evidence linking SO2 exposure to chronic health impacts
Respirable particulate matter (PM_{10}), Fine particulate matter ($PM_{2.5}$)	fugitive dust, soot, smoke, mobile and stationary sources, construction, fires and natural windblown dust, and formation in the atmosphere by condensation and/or transformation of SO2 and ROG	breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular diseases, premature death	alterations to the immune system, carcinogenesis
Lead	metal processing	reproductive/ developmental effects (fetuses and children)	numerous effects including neurological, endocrine, and cardiovascular effects

Notes: NOX = oxides of nitrogen; ROG = reactive organic gases.

1. "Acute" refers to effects of short-term exposures to criteria air pollutants, usually at fairly high concentrations.
2. "Chronic" refers to effects of long-term exposures to criteria air pollutants, usually at lower, ambient concentrations.

Sources: EPA 2016

Table 4.3-3
Attainment Status Designations for South Coast Air Basin

Pollutant	National Ambient Air Quality Standard	California Ambient Air Quality Standard
Ozone	Nonattainment (1-hour) Classification=Extreme	Nonattainment (1-hour)
	Nonattainment (8-hour)1 Classification=Extreme	Nonattainment (8-hour)
	Nonattainment (8-hour)2 Classification=Extreme	
Respirable particulate matter (PM_{10})	Attainment (24-hour) Classification = Maintenance	Nonattainment (24-hour)
		Nonattainment (Annual)
Fine particulate matter ($PM_{2.5}$)	Nonattainment (24-hour) Classification = Serious	(No State Standard for 24-Hour)
	Nonattainment (Annual)[3]	Nonattainment (Annual)
	Nonattainment (Annual)[4] Classification = Serious	
Carbon monoxide (CO)	Attainment (1-hour) Classification=Maintenance	Attainment (1-hour)
	Attainment (8-hour) Classification=Maintenance	Attainment (8-hour)
Nitrogen dioxide (NO2)	Unclassified/Attainment (1-hour)	Attainment (1-hour)
	Attainment (Annual) Classification=Maintenance	Attainment (Annual)
Sulfur dioxide (SO2)	(Designation Pending) (1-Hour)	Unclassifiable/Attainment (1-hour)
		Unclassifiable/Attainment (24-hour)
Lead (Particulate)	Nonattainment (3-month rolling avg.) Classification=Partial	Attainment (30-day average)
Hydrogen Sulfide	No Federal Standard	Attainment (1-hour)
Sulfates		Unclassifiable (24-hour)

Notes:

1. 1997 Standard.
2. 2008 Standard.
3. 1997 Standard.
4. 2012 Standard.

Source: SCAQMD 2016

Monitoring Station Data and Attainment Designations

Criteria air pollutant concentrations are measured at several monitoring stations in the SCAB. The Lake Elsinore, Perris, and Riverside-Rubidoux's average air quality data best represents the project area with recent data for ozone, PM_{10}, and $PM_{2.5}$. Table 4.3-4 summarizes the air quality data from the most recent three years (2016–2018).

Both CARB and EPA use this type of monitoring data to designate areas according to their attainment status for criteria air pollutants (attainment designations are summarized in Table 4.3-3 above).

Table 4.3-4
Summary of Annual Data on Ambient Air Quality (2016-2018)

	2016	2017	2018
Ozone			
Maximum concentration (1-hr/8-hr avg, ppm)	0.124/0.093	0.121/0.098	0.116/0.095
Number of days state standard exceeded (1-hr/8-hr)	15/*	23/*	16/*
Number of days national standard exceeded (1-hr/8-hr)	0/44	0/54	0/30
Fine Particulate Matter ($PM_{2.5}$)			
Maximum concentration (24-hour µg/m3)	51.5	50.3	66.3
Number of days national standard exceeded (24-hour measured)	5	7	3
Respirable Particulate Matter (PM_{10})			
Maximum concentration (µg/m3)	76.0	75.4	64.4
Number of days state standard exceeded	5	11	2
Number of days national standard exceeded	0	0	0

Notes: µg/m3 = micrograms per cubic meter; ppm = parts per million; * = Data not available; Ozone (O3) measurements from Lake Elsinore-W Flint Street Monitoring Station. Fine particulate matter (PM2.5) from the Riverside-Rubidoux Monitoring Station. Respirable particulate matter (PM10) measurements form Perris Monitoring Station.

Source: CARB 2019

Toxic Air Contaminants

According to the California Almanac of Emissions and Air Quality (CARB 2013), the majority of the estimated health risks from TACs can be attributed to relatively few compounds, the most important being diesel PM. Diesel PM differs from other TACs in that it is not a single substance, but rather a complex mixture of hundreds of substances. Although diesel PM is emitted by diesel-fueled internal combustion engines, the composition of the emissions varies depending on engine type, operating conditions, fuel composition, lubricating oil, and whether an emissions control system is being used. Unlike the other TACs, no ambient monitoring data are available for diesel PM because no routine measurement method currently exists. However, CARB has made preliminary concentration estimates based on a PM exposure method. This method uses the CARB emissions inventory's PM_{10} database, ambient PM_{10} monitoring data, and the results from several studies to estimate concentrations of diesel PM. In addition to diesel PM, the TACs for which data are available that pose the greatest existing ambient risk in California are benzene, 1,3-butadiene, acetaldehyde, carbon tetrachloride, hexavalent chromium, para-dichlorobenzene, formaldehyde, methylene chloride, and perchloroethylene. Overall, levels of most TACs, except para-dichlorobenzene and formaldehyde, have decreased since 1990 (CARB 2013).

Odors

Odors are generally regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache).

With respect to odors, the human nose is the sole sensing device. The ability to detect odors varies considerably among the population and overall is quite subjective. Some individuals can smell very minute quantities of specific substances; others may not have the same sensitivity but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor; an odor that is offensive to one person may be perfectly acceptable to another (e.g., fast food restaurant). It is important to also note that an unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. This is because of the phenomenon known as odor fatigue, in which a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity. Odor sources of concern can include wastewater treatment plants, sanitary landfills, composting facilities, recycling facilities, petroleum refineries, chemical manufacturing plants, painting operations, rendering plants, and food packaging plants.

Existing Emissions Sources

The 2011 General Plan EIR summarized emissions of criteria air pollutants and ozone precursors within the City for various source categories in 2008. Table 4.3-5, 2011 General Plan Summary of 2035 Estimated Emissions Inventory for the City of Murrieta, summarizes the emissions for area, mobile, and indirect source categories. According to the emissions inventory, mobile sources account for the greatest contribution to the estimate annual average emissions of air pollutants.

Table 4.3-5
2011 General Plan Summary of 2035 Estimated Emissions Inventory for the City of Murrieta

Source Type	Estimated Annual Average Emissions (Tons/Year)					
	ROG	NO_x	CO	SO_X	PM_{10}	$PM_{2.5}$
Area Sources						
Natural Gas Combustion	14.23	188.52	109.40	0.00	0.35	0.35
Landscaping Equipment	48.10	3.02	267.22	0.01	0.71	0.70
Consumer Products	416.47	-	-	-	-	-
Architectural Coatings	78.67	-	-	-	-	-
Subtotal (Area Sources)	557.47	191.54	376.62	0.01	1.06	1.05
Indirect Sources						
Energy Consumption	4.47	514.00	0.09	53.70	17.90	-
Water Conveyance	0.11	12.60	2.20	1.32	0.44	-
Subtotal (Indirect Sources)	4.58	526.60	2.29	55.02	18.34	0.00
Mobile Sources (by land use category)						
Single Family Housing	425.40	594.36	5,090.88	5.76	992.57	193.26
Multifamily Housing	115.60	156.97	1,344.52	1.52	262.14	51.04
High School [civic/institutional]	18.14	26.37	217.64	0.25	43.98	8.55
City Park	8.81	8.80	72.34	0.08	14.66	2.85
Strip Mall	918.75	1,400.62	11,486.63	13.38	2,331.08	453.11
Professional Office	246.53	354.02	2,972.14	3.43	593.68	115.48
Office Park [business park]	180.87	560.13	2,200.81	2.53	437.33	85.09
General Light Industrial	15.17	21.00	177.83	0.20	35.31	6.87
Subtotal (Mobile Sources)	1,929.27	3,122.27	23,562.79	27.15	4,710.75	916.25
TOTAL	**2,491.32**	**3,840.41**	**23,941.70**	**82.18**	**4,730.15**	**917.30**

Notes: Tons/year = tons per year; ROG = reactive organic gases; NOX = oxides of nitrogen; CO = carbon monoxide; SOx = sulfur dioxide; PM_{10} = respirable particulate matter; $PM_{2.5}$ = fine particulate matter

Source: City of Murrieta 2011

Sensitive Receptors

Sensitive receptors are generally considered to include those land uses where exposure to pollutants could result in health-related risks to sensitive individuals, such as children or the elderly. Sensitive receptors are people, or facilities that generally house people (e.g., schools, hospitals, residences), that may experience adverse effects from unhealthful concentrations of air pollutants. Sensitive receptors mentioned in the 2011 General Plan EIR are consistent with the proposed Project.

4.3.3 Significance Threshold Criteria

Methodology

Regional and local criteria air pollutant emissions and associated impacts, as well as impacts from TACs, CO concentrations, and odors were assessed in accordance with SCAQMD-recommended methodologies. Attachment A of the Draft Tech Memo: Air Quality and Greenhouse Gas Impact Analysis (Appendix C) provides modeling and emissions calculations according SCAQMD guidelines. Potential impacts from construction were assessed qualitatively as the specific duration, frequency, and intensity of construction activities that could occur under the proposed Project are known at this time. Operations of the proposed Project land use changes were calculated using the California Emissions Estimator Model (CalEEMod) Version 2016.3.2 computer program, as recommended by SCAQMD. Plan-specific information, where available, and default values according to land use type and location in CalEEMod were used to model the net change of operational emissions. Mobile-source emissions were also modeled in CalEEMod using the net vehicle miles traveled (VMT) as provided in the VMT analysis provided in the Vehicle Miles Travel (VMT) Analysis by VRPA Technologies, Inc. on August 16, 2019 (Appendix G). Emissions associated with consumption of energy (electricity and natural gas), the use of consumer products, and landscape maintenance activities were estimated using the applicable modules in CalEEMod. Operational emissions from all sources were estimated for full buildout of the proposed Project which is anticipated to occur by 2035.

TACs and mobile source CO impacts were assessed qualitatively, using the screening criteria set forth by SCAQMD and CARB and results from the VMT Analysis by VRPA Technologies, Inc.

The assessment of odor-related impacts is based on the types of odor sources associated with the land uses that would be developed under the project and their location relative to existing off-site sensitive receptors.

Thresholds of Significance

The Initial Study Environmental Checklist, Appendix G of the CEQA Guidelines, was used as the significance criteria in the 2011 General Plan EIR. Since the 2011 General Plan EIR was certified, Appendix G has been updated. A project would have a significant effect on the environment if it would:

- Conflict with or obstruct implementation of the applicable air quality plan.
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard.
- Expose sensitive receptors to substantial pollutant concentrations.
- Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

Appendix G of the CEQA Guidelines states that the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make these determinations. SCAQMD's mass daily significance thresholds for both construction and operation of the project are provided in the 2011 General Plan EIR (See Table 5.5-5, page 5.5-14 of the 2011 General Plan EIR) and have not changed for the purpose of this analysis. Thus, the air quality impact analysis for the proposed Project relies on SCAQMD's significance criteria.

4.3.4 Project Impacts and Mitigation Measures

THE PROPOSED PROJECT MAY CONFLICT WITH OR OBSTRUCT IMPLEMENTATION OF THE APPLICABLE AIR QUALITY PLAN

Level of Significance Before Mitigation: Less Than Significant Impact.

Impact Analysis: The 2011 General Plan EIR identified a less than significant impact regarding its consistency with other regional plans due to its goals and policies falling under the same objectives as other plans. The two criteria required by SCAQMD for evaluation of plan consistency analyzed in the 2011 General Plan are relevant to this analysis and discussed below.

Criterion 1

The first criterion requires projects to forecast emissions contributing to air quality violations and attainment. As mentioned in the 2011 General Plan, all future development is required to comply with SCAQMD regulations and permitting requirements. In addition, all developments would be subject to the goals and policies in the 2011 General Plan to help reduce air quality impacts. Because project-level construction details are not provided for this plan-level analysis, construction emissions are not able to be analyzed at the level of detail needed to determine whether they would contribute to an air quality violation. Operational emissions were determined to be less than significant and would not contribute to an air quality violation or deter attainment. As previously stated, individual project construction and operational project under the proposed Project would be required to comply with its goals and policies and SCAQMD regulations.

Criterion 2

Under the second criterion, SCAQMD considers a project to be consistent with existing air quality plans and other relevant documents if the project's land use changes and growth rates remain consistent with those in the existing plan. Projects that do not increase dwelling unit density, vehicle trips, or VMT above the projected rates included in relevant air quality plans are not considered to exceed this threshold (SCAQMD 1993). The most relevant and applicable air quality plans for the SCAB are SCAQMD's 2016 AQMP and SCAG's 2016 Regional Transportation Plan/Sustainable Communities

Strategy (RTP/SCS). Regional air quality emissions projections used in the SIP and the AQMP are based on the growth projections included in the RTP/SCS. Therefore, projects that are consistent with these growth projections would also be consistent with regional air quality emissions projections and attainment status regarding CAAQS and NAAQS.

The proposed Project includes changes to the land uses upon which the AQMP and 2016 RTP/SCS were based. However, the focus of the proposed Project is to create a job to housing balance that would create jobs and reduce the VMT within the City which is consistent with the goals of the RTP/SCS plan. Like the 2011 General Plan, the proposed Project includes several updated goals and policies within the Circulation, Land Use, Air Quality, Conservation, and Safety Elements pertaining to regional mobility, reduced vehicle trips, energy efficiency, smart land use patterns, and emergency management, which are consistent with SCAG's RTP goals and Compass Growth Visioning Regional Growth Principles. Furthermore, operational emissions would be lower under the proposed Project relative to the 2011 General Plan and would reduce the contribution towards an air quality violation or attainment. Additionally, all future development is required to comply with the goals and policies that would reduce air quality impacts. Therefore, the proposed Project would comply with applicable regional plans and would be considered less than significant in this regard.

Mitigation Measures: Not Applicable

Level of Significance After Mitigation: Not Applicable

- **IMPLEMENTATION OF THE PROPOSED PROJECT COULD RESULT IN A CUMULATIVELY CONSIDERABLE NET INCREASE OF ANY CRITERIA POLLUTANT FOR WHICH THE PROJECT REGION IS NON-ATTAINMENT UNDER AN APPLICABLE FEDERAL OR STATE AMBIENT AIR QUALITY STANDARD**

SHORT-TERM CONSTRUCTION EMISSIONS

Level of Significance Before Mitigation: Potentially Significant Impact.

Impact Analysis: The proposed Project would allow for development of an additional 1,572 residential units, beyond those considered in the 2011 General Plan. Construction of these 1,572 new residential units under the proposed Project would result in a net increase in emissions beyond those analyzed for the 2011 General Plan. Construction-related activities associated with the implementation of the proposed residential units would generate emissions of ROG, NO_X, SO_X, CO, PM_{10}, and $PM_{2.5}$ from site preparation; use of off-road construction equipment; material handling; on-road vehicle trips; architectural coating; paving; and other construction-related activities.

As was the case with the 2011 General Plan, the proposed Project is program-level in nature and therefore, specific information about individual land use developments, and the duration, frequency, and intensity of construction, and potential overlap between construction activities is not available at this time. Therefore, construction-related emissions due to the implementation of the proposed Project cannot be accurately quantified, and such an analysis would be considered speculative. In addition, the proposed Project would reduce 2,405,601 square feet of non-residential development in the City. From time of adoption of the proposed Project to buildout year 2035, construction projects would occur throughout the City and would be dependent upon factors such as the nature and quantity of projects initiated by developers and approvals by the City, thus the timing, rate, and level of future construction emissions emitted cannot be precisely anticipated under the general provisions of the proposed Project.

As stated in the 2011 General Plan EIR Section 5.5.4, all goals and policies related to reducing criteria air pollutants and precursors (AQ-3.1 – AQ-3.4 and AQ-7.1 – AQ-7.4) would be required to be addressed in all construction projects within the City (page 5.5-16). However, even with implementation of the 2011 General Plan goals and policies, the proposed Project construction projects could have the potential to exceed SCAQMD construction thresholds. Ambient air quality standards are established to be protective of public health and if exceeded could expose receptors to adverse health impacts. Because implementation of the proposed Project has the potential to exceed SCAQMD's construction thresholds, the proposed Project could exacerbate or interfere with the region's ability to attain the health-based standards. Therefore, construction-related air quality impacts would be potentially significant for the proposed Project, consistent with the potentially significant impact identified in the 2011 General Plan EIR.

Mitigation Measures:

AQ-1 Require the use of Tier 4 emissions standards or better for off-road diesel-powered construction equipment of 50 horsepower or greater. To ensure that Tier 4 construction equipment or better will be used during the proposed Project's construction, SCAQMD staff recommends that the Lead Agency include this requirement in applicable bid documents, purchase orders, and contracts. Successful contractor(s) must demonstrate the ability to supply the compliant construction equipment for use prior to any ground disturbing and construction activities. A copy of each unit's certified tier specification or model year specification and California Air Resources Board (CARB) or SCAQMD operating permit (if applicable) shall be available upon request at the time of mobilization of each applicable unit of equipment. Additionally, the Lead Agency should require periodic reporting and provision of written construction documents by construction contractor(s) to ensure compliance and conduct regular inspections to the maximum extent feasible to ensure compliance.

AQ-2 Require zero-emissions or near-zero emission on-road haul trucks such as heavy-duty trucks with natural gas engines that meet the CARB's adopted

optional NOx emissions standard at 0.02 grams per brake horsepower-hour (g/bhp-hr), if and when feasible. At a minimum, require that construction vendors, contractors, and/or haul truck operators commit to using 2010 model year trucks (e.g., material delivery trucks and soil import/export) that meet CARB's 2010 engine emissions standards at 0.01 g/bhp-hr of particulate matter (PM) and 0.20 g/bhp-hr of NOx emissions or newer, cleaner trucks. The Lead Agency should include this requirement in applicable bid documents, purchase orders, and contracts. Operators shall maintain records of all trucks associated with project construction to document that each truck used meets these emission standards, and make the records available for inspection. The Lead Agency should conduct regular inspections to the maximum extent feasible to ensure compliance.

AQ-3 Suspend all on-site construction activities when wind speeds (as instantaneous gusts) exceed 25 miles per hour.

AQ-4 All trucks hauling dirt, sand, soil or other loose materials are to be covered, or should maintain at least two feet of freeboard in accordance with California Vehicle Code Section 23114 (freeboard means vertical space between the top of the load and top of the trailer).

AQ-5 Enter into applicable bid documents, purchase orders, and contracts to notify all construction vendors, contractors, and/or haul truck operators that vehicle and construction equipment idling time will be limited to no longer than five minutes, consistent with the CARB's policy. For any idling that is expected to take longer than five minutes, the engine should be shut off. Notify construction vendors, contractors, and/or haul truck operators of these idling requirements at the time that the purchase order is issued and again when vehicles enter the proposed Project site. To further ensure that drivers understand the vehicle idling requirement, post signs at the proposed Project site, where appropriate, stating that idling longer than five minutes is not permitted.

AQ-6 Have truck routes clearly marked with trailblazer signs, so that trucks will not enter residential areas.

AQ-7 Limit the daily number of trucks allowed at the proposed Project to levels analyzed in the CEQA document. If higher daily truck volumes are anticipated to visit the site, the Lead Agency should commit to re-evaluating the proposed Project through the CEQA process prior to allowing this land use or higher activity level.

Level of Significance After Mitigation: Through adherence with the goals and policies from the 2011 General Plan stated above, as well as the Mitigation Measures (AQ-1 through AQ-7), the proposed Project would not result in a new significant impact or a substantial increase in the severity of the previously identified significant impact in

terms of construction-related air quality impacts. However, even with implementation of the 2011 General Plan goals and policies, the proposed Project's construction projects could have the potential to exceed SCAQMD construction thresholds. Therefore, similarly to the 2011 General Plan, the proposed Project would result in a Significant Unavoidable Impact in this regard.

LONG-TERM MOBILE AND STATIONARY SOURCE EMISSIONS

Level of Significance Before Mitigation: Potentially Significant Impact.

Impact Analysis: Operation of the proposed 1,572 residential units would result in the generation of long-term operational emissions of ROG, NO_X, PM_{10}, $PM_{2.5}$, SO_X and CO. The non-residential development excluded from the 2011 General Plan would avoid the generation of long-term operational emissions. The addition of residential units would serve to increase emissions beyond those analyzed in the 2011 General Plan EIR, while the reduction in allowable non-residential development would reduce emissions from the same analysis. In addition to the land use changes, citywide VMT was assessed to determine the change in VMT from the two General Plan scenarios. The net 2035 citywide VMT under the 2011 General Plan compared to the proposed Project, provided by VRPA Technologies, Inc. (Appendix G), was estimated to be a decrease of 93,028 miles. This decrease in VMT is due to the proposed increase in residential units to be oriented toward employment area, reducing the VMT to and from residences and places of employment.

Additional sources of operational emissions evaluated for this study include the use of electricity and natural gas; landscape maintenance equipment such as mowers and leaf blowers; application of architectural coatings as part of regular maintenance; and the use of various consumer produce such as cleaning chemicals that would also generate emissions of ROG. Because building energy efficiency is unknown for build out year 2035, energy emissions were modeled conservatively based on 2019 Title 24 standards. Table 4.3-6 summarizes the net change in maximum daily operations-related emissions of criteria air pollutants and precursors from the land uses proposed under the proposed Project.

Table 4.3-6
Net Emissions of General Plan Update

Source Type	Estimated Maximum Daily Emissions (lb/day)					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
General Plan Update: Net Residential Unit Increase						
Area	38	1	129	<1	1	1
Energy	<1	4	2	<1	<1	<1
Subtotal	38	6	131	<1	1	1
General Plan Update: Net Non-Residential Land Use Decrease						
Area	-54	- <1	- <1	- <1	- <1	- <1
Energy	-2	-18	-15	-- <1	-1	-1
Subtotal	**-56**	**-18**	**-15**	**- <1**	**-1**	**-1**
General Plan Update: Net Mobile Decrease						
Subtotal	-10	-77	-120	-1	-71	-19
General Plan Update Net TOTAL	**-27**	**-89**	**-4**	**-1**	**-71**	**-19**
SCAQMD Thresholds of Significance	**55**	**55**	**550**	**150**	**150**	**55**
Threshold Exceeded?	**No**	**No**	**No**	**No**	**No**	**No**

Notes: lb/day = pounds per day; ROG = reactive organic gases; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur dioxide; PM_{10} = respirable particulate matter; $PM_{2.5}$ = fine particulate matter; SCAQMD = South Coast Air Quality Management District.

Table 4.3-6 shows that the proposed Project would decrease overall citywide emissions relative to overall development under the 2011 General Plan. However, the reduction in emissions would not reduce overall operations emissions to below SCAQMD's significance threshold. Furthermore, the land uses proposed under the proposed Project with the increase in residential units, decrease in nonresidential square footage, and decrease in VMT would contribute to nonattainment designations.

If the proposed Project exceeds SCAQMD's thresholds and contributes to nonattainment designations, it would exacerbate or interfere with the region's ability to attain the health-based standards. Thus, the exposure of criteria air pollutants that may exceed the NAAQS and CAAQS would exacerbate health impacts. Full buildout of the proposed Project's land uses would cause emissions to exceed SCAQMD's recommended thresholds, thus violating air quality standards and would contribute substantially to an existing or projected air quality violation. Because the ambient air quality standards are established to be protective of public health, adverse health impacts to receptors are anticipated due to the project's emissions being above SCAQMD's thresholds. As individual developments anticipated under the proposed Project are evaluated, potential impacts to nonattainment levels and health risk may be found to not be significant.

In addition to the goals and policies identified in the 2011 General Plan (AQ-1.1 – AQ-1.5, AQ-2.1 – AQ-2.5, AQ-4.1 – AQ-4.4, AQ-5.1 – AQ-5.7, AQ-6.1, AQ-6.3 – AQ-6.7, AQ-7.1, AQ-7.3, LU-8.1, LU-8.2, CIR-1.4, CIR-5.9 – CIR-5.12, and CIR-6.1 – CIR-6.12), the proposed Project provides revised and/or new goals that are applicable to reducing

operations-related emissions. Land Use policies LU-7.9 through 7.10 provides residents with access to other land uses. Policies LU-17.3 through 17.6 encourage mixed-use development that provide various sources to the community. Circulation policy CIR-6.15 encourage adoption of VMT measurement for CEQA evaluations.

Therefore, for this program level analysis, mobile and stationary source emissions impacts would be potentially significant for the proposed Project, consistent with the potentially significant impact identified in the 2011 General Plan EIR.

Mitigation Measures:

AQ-8 Provide electric vehicle (EV) Charging Stations (see the discussion below regarding EV charging stations).

AQ-9 Should the proposed Project generate significant regional emissions, the Lead Agency should require mitigation that requires accelerated phase-in for non-diesel powered trucks. For example, natural gas trucks, including Class 8 HHD trucks, are commercially available today. Natural gas trucks can provide a substantial reduction in health risks, and may be more financially feasible today due to reduced fuel costs compared to diesel. In the Draft SEIR, the Lead Agency should require a phase-in schedule for these cleaner operating trucks to reduce any significant adverse air quality impacts. SCAQMD staff is available to discuss the availability of current and upcoming truck technologies and incentive programs with the Lead Agency.

AQ-10 Trucks that can operate at least partially on electricity have the ability to substantially reduce the significant NOx impacts from this project. Further, trucks that run at least partially on electricity are projected to become available during the life of the project as discussed in the 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy (2016-2040 RTP/SCS). It is important to make this electrical infrastructure available when the project is built so that it is ready when this technology becomes commercially available. The cost of installing electrical charging equipment onsite is significantly cheaper if completed when the project is built compared to retrofitting an existing building. Therefore, SCAQMD staff recommends the Lead Agency require the proposed Project and other plan areas that allow truck parking to be constructed with the appropriate infrastructure to facilitate sufficient electric charging for trucks to plug-in. Similar to the City of Los Angeles requirements for all new projects, SCAQMD staff recommends that the Lead Agency require at least 5% of all vehicle parking spaces (including for trucks) include EV charging stations. Further, electrical hookups should be provided at the onsite truck stop for truckers to plug in any onboard auxiliary equipment. At a minimum, electrical panels should be appropriately sized to allow for future expanded use.

AQ-11 Design warehouses or distribution centers such that entrances and exits are such that trucks are not traversing past neighbors or other sensitive receptors.

AQ-12 Design warehouses or distribution centers such that any check-in point for trucks is well inside the site to ensure that there are no trucks queuing outside of the facility.

AQ-13 Design warehouses or distribution centers to ensure that truck traffic within the site is located away from the property line(s) closest to its residential or sensitive receptor neighbors.

AQ-14 Restrict overnight parking in residential areas.

AQ-15 Establish overnight parking within warehouses or distribution centers where trucks can rest overnight.

AQ-16 Establish area(s) within warehouses or distribution centers for repair needs.

AQ-17 Develop, adopt and enforce truck routes to and from warehouses or distribution centers that avoid sensitive receptors, where feasible.

AQ-18 Create a buffer zone of at least 300 meters (roughly 1,000 feet), which can be office space, employee parking, greenbelt, etc. between warehouses or distribution centers and sensitive receptors.

AQ-19 Maximize use of solar energy including solar panels; installing the maximum possible number of solar energy arrays on the building roofs and/or on the proposed Project site to generate solar energy for the facility.

AQ-20 Maximize the planting of trees in landscaping and parking lots.

AQ-21 Use light colored paving and roofing materials (e.g., “cool” roofs and “cool” pavements).

AQ-22 Utilize only Energy Star heating, cooling, and lighting devices, and appliances.

AQ-23 Require use of electric or alternatively fueled sweepers with HEPA filters.

AQ-24 Use of water-based or low VOC cleaning products.

Level of Significance After Mitigation: Through adherence with the goals and policies from the 2011 General Plan and the proposed Project, as well as the Mitigation Measures stated above (AQ-8 through AQ-24), the proposed Project would not result in a new significant impact or a substantial increase in the severity of the previously identified significant impact in terms of mobile and stationary source emissions. However, even with implementation of the 2011 General Plan goals and policies and new proposed Project policies, development under the proposed Project could have the potential to exceed SCAQMD thresholds. Therefore, similarly to the 2011 General Plan, the proposed Project would result in a Significant Unavoidable Impact to long-term mobile and stationary source emissions.

IMPLEMENTATION OF THE PROPOSED PROJECT COULD EXPOSE SENSITIVE RECEPTORS TO SUBSTANTIAL POLLUTANT CONCENTRATIONS

Level of Significance Before Mitigation: Less than Significant Impact.

Impact Analysis: The exposure of sensitive receptors to TAC emissions from project-generated construction and operational sources is discussed separately below. Diesel PM is the focus of this analysis because it is the TAC of primary concern when evaluating health risk. Although other TACs exist (e.g., benzene, 1, 3-butadiene, hexavalent chromium, formaldehyde, methylene chloride), they are primarily associated with industrial operations.

Construction

Construction-related activities associated with the project would result in temporary, intermittent emissions of diesel PM from the exhaust of off-road heavy-duty diesel equipment use for site preparation (e.g., demolition, clearing, grading); paving; application of architectural coatings; on-road truck travel; and other miscellaneous activities. For construction activity, diesel PM is the primary TAC of concern. On-road diesel-powered haul trucks traveling to and from the construction area to deliver materials and equipment are less of a concern because they would not stay on the site for long durations.

Diesel PM was identified as a TAC by CARB in 1998. The potential cancer risk from the inhalation of diesel PM outweighs the potential for all other health impacts (i.e., non-cancer chronic risk, short-term acute risk) and health impacts from other TACs (CARB 2003). With regards to exposure of diesel PM, the dose to which receptors are exposed is the primary factor used to determine health risk. Dose is a function of the concentration of a substance or substances in the environment and the duration of exposure to the substance. Dose is positively correlated with time, meaning that a longer exposure period would result in a higher level of health risk for any exposed receptor. According the California Office of Environmental Health and Assessment's (OEHHA's) 2015 Guidance, exposure of sensitive receptors to TAC emissions should

be based on a 30-year exposure period for estimating cancer risk at the maximum exposed individual resident (MEIR), with 9- and 70-year exposure periods at the MEIR as supplemental information. Furthermore, 70-year exposure period is required for estimating cancer burden or providing an estimate of population-wide risk (OEHHA 2015:8-1).

The use of off-road heavy-duty diesel equipment would be limited to the individual construction project under the proposed Project. Because construction details for individual project under the proposed Project are unknown, this analysis is unable to determine the dose of exposure to any one sensitive receptor. Construction projects are required to comply with the goals and policies under the 2011 General Plan, proposed Project, and SCAQMD standards and therefore no new or worse impacts would result from construction projects

Operations

The operational TAC analysis evaluates new sources associated with the proposed Project build out (e.g., increased vehicular traffic, stationary or commercial land uses) and the placement of new sensitive receptors in close proximity to existing TAC sources. The analysis is based on available guidance from CARB and SCAQMD shown below in Table 4.3-7.

Table 4.3-7
California Air Resources Board Recommendations on Siting New Sensitive Land Uses Such as Residences, Schools, Daycare Centers, Playgrounds, or Medical Facilities

Source Category	Advisory Recommendations
Freeways and High-Traffic Roads	• Avoid siting new sensitive land uses within 500 feet of a freeway, urban roads with 100,000 vehicles/day, or rural roads with 50,000 vehicles/day
Distribution Centers	• Avoid siting new sensitive land uses within 1,000 feet of a distribution center (that accommodates more than 100 trucks per day, more than 40 trucks with TRUs operating per day, or where TRU unit operations exceed 300 hours per week). • Take into account the configuration of existing distribution centers and avoid locating residences and other new sensitive land uses near entry and exit points
Rail Yards	• Avoid siting new sensitive land uses within 1,000 feet of a major service and maintenance rail yard. • Within one mile of a rail yard, consider possible siting limitations and mitigation approaches
Ports	• Avoid siting of new sensitive land uses immediately downwind of ports in the most heavily impacted zones. Consult local air districts or the CARB on the status of pending analyses of health risks.
Refineries	• Avoid siting new sensitive land uses immediately downwind of petroleum refineries. Consult with local air districts and other local agencies to determine an appropriate separation.
Chrome Platers	• Avoid siting new sensitive land uses within 1,000 feet of a chrome

Source Category	Advisory Recommendations
	plater
Dry Cleaners Using Perchloroethylene	• Avoid siting new sensitive land uses within 300 feet of any dry-cleaning operation. For operations with two or more machines, provide 500 feet. For operations with 3 or more machines, consult with the local air district. • Do not site new sensitive land uses in the same building with perc dry cleaning operations.
Gasoline Dispensing Facilities	• Avoid siting new sensitive land uses within 300 feet of a large gas station (defined as a facility with a throughput of 3.6 million gallons per year or greater). A 50-foot separation is recommended for typical gas dispensing facilities.

Notes: CARB = California Air Resources Board; TRU = transport refrigeration unit; vehicles/day = vehicles per day
Source: CARB 2005

Operation of new land uses could generate new sources of TACs from commercial land uses (e.g., gasoline dispensing facilities and dry cleaners). Land uses that have the potential to generate stationary source emissions would be required to obtain a permit from SCAQMD. If the facility has the potential to generate health risks above established risk levels, facilities are required to distribute public notifications to both residential, non-residential, and parents of children attending school within the area of impact and develop and implement a risk reduction plan.

In addition, the proposed Project would result in a decrease in 93,028 vehicle trips distributed over the City roadways and intersections. In accordance with CARB's Air Quality and Land Use Handbook, high volume roads and freeways are the primary sources of TACs within urban areas. Freeways or urban roads experiencing 100,000 or more vehicles/day could expose sensitive receptors to adverse health risks. It is likely under this project that freeways and roads within the project area would not exceed 100,000 vehicles/day. Because the proposed Project would result in a substantial decrease in trips to the surrounding roadway network, a substantial decrease in health risk levels associated with vehicular traffic, exposing existing and future planned land uses to decreased TAC levels. There would be no additional or worse impacts than those determined in the 2011 General Plan.

Implementation of the goals and policies included in the 2011 General Plan (AQ-1.1 – AQ-1.5, AQ-2.1 – AQ-2.5, AQ-4.1 – AQ-4.4, AQ-5.1 – AQ-5.7, AQ-6.1, AQ-6.3 – AQ-6.7, AQ-7.1, AQ-7.3, LU-8.1, LU-8.2, CIR-1.4, CIR-5.9 – CIR-5.12, and CIR-6.1 – CIR-6.12), SCAQMD's permit requirements for stationary sources, and the reduction in future citywide VMT relative to the 2011 General Plan would reduce the health risk to sensitive receptors. Therefore, the impact on sensitive receptors in regard to pollutant concentrations would be less than significant for the proposed Project.

Mitigation Measures: Not Applicable

Level of Significance After Mitigation: Not Applicable

- **IMPLEMENTATION OF THE PROPOSED PROJECT COULD RESULT IN OTHER EMISSIONS (SUCH AS THOSE LEADING TO ODORS) ADVERSELY AFFECTING A SUBSTANTIAL NUMBER OF PEOPLE.**

ODOR IMPACTS

Level of Significance Before Mitigation: Less Than Significant Impact.

Impact Analysis: The occurrence and severity of odor impacts depends on numerous factors, including: the nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of the affected receptors. While offensive odors rarely cause any physical harm, they still can be very unpleasant, leading to considerable distress among the public and often generate citizen complaints to local governments and regulatory agencies. Projects with the potential to frequently expose a substantial number of people to objectionable odors would be deemed to have a significant impact. Though construction project details under the proposed Project are unknown, odors from the use of heavy-duty diesel equipment, and the laying of asphalt during project-related construction activities would be intermittent and temporary and would dissipate rapidly from the source with an increase in distance.

The proposed land uses under the proposed Project are not considered significant odor generators that would adversely affect sensitive receptors during operations; all land uses would contain uses that are common in the surrounding areas. The goals and policies provided in the 2011 General Plan (AQ-2.1 through AQ-2.5 and AQ-6.1) would help reduce exposure of odors to sensitive receptors through land use decisions under the proposed Project. Operation of this new development would be subject to these goals and policies and shall be subject to SCAQMD Rule 402. In addition, future citywide VMT under the proposed Project would decrease relative to future citywide VMT under the 2011 General Plan, which would not increase and could reduce odors associated with on-road vehicles.

Therefore, implementation of the proposed Project would not result in exposure of a substantial number of people to objectionable odors and would be a less than significant impact.

Mitigation Measures: Not Applicable

Level of Significance After Mitigation: Not Applicable

CARBON MONOXIDE HOTSPOTS

Level of Significance Before Mitigation: Less Than Significant Impact.

Impact Analysis: Local mobile-source CO emissions near roadway intersections are a direct function of traffic volume, vehicle speed, and traffic delay. A CO hotspot is an area of localized CO pollution that is caused by severe vehicle congestion on major roadways, typically near intersections. Transport of CO is extremely limited because it disperses rapidly with distance from the source under normal meteorological conditions. However, under stable meteorological conditions, CO concentrations near roadways and/or intersections may reach unhealthy levels adversely affecting nearby sensitive land uses, such as residential units, hospitals, schools, and childcare facilities. CO is a pollutant of localized concern and, therefore, analyzed at the local level. Construction activities are rarely a cause of localized CO impacts because they do not typically result in substantial traffic increases at any one location.

As discussed in the SCAQMD AQMP and seen in Table 4.3-3, the SCAB is in attainment for both 1-hour and 8-hour CO concentrations under CAAQS and NAAQS. As the AQMP notes, the SCAB gained attainment status for CO concentrations in 2007 and has remained in attainment status for this pollutant since that time. In 2015, SCAQMD measured CO concentrations at 25 locations in the SCAB as well as two locations that measured near-road CO concentrations. Maximum CO concentrations in Los Angeles County were 3.3 ppm for the 8-hour averaging time in 2015. This concentration is well below the NAAQS 1-hour and 8-hour standards (i.e.,35 ppm and 9 ppm, respectively; SCAQMD 2017). As part of the AQMP, SCAQMD also modeled future pollutant emissions within the SCAB based on population growth rates, current air quality regulations and other key factors for the year 2031. Modeling results found that although on-road mobile emissions continue to be a major contributor of CO and NOX emissions, current rules and regulations on mobile source emissions will result in a decrease in CO concentrations within the SCAB by 2031 and will not impact the attainment status for CO (SCAQMD 2017:3-19).

The 2011 General Plan determined that there would be a less than significant impact to increase mobile-source CO concentrations with its adoption. It was concluded that at full build out, no intersection in the City would experience an average daily traffic (ADT) volume that would exceed 100,000 vehicles per day under CARBS's guidance. In addition, adherence to the 2011 goal and polices CIR-1.2, CIR-1.4, CIR-1.6, and CIR-1.8 would ensure intersections would optimize traffic flow through the City and reduce traffic queuing.

The City of Murrieta Focused General Plan Update Traffic Impact Analysis report by Iteris, Inc.(Appendix E) analyzed key intersections and roadways under conditions of the proposed Project. Table 12 in the TIA report (See Appendix E) determined that no intersection capacity or roadway would exceed 100,000 vehicles per day. Therefore, the impact related to carbon monoxide hotspots would be considered less than significant for the proposed Project.

Mitigation Measures: Not Applicable

Level of Significance After Mitigation: Not Applicable

4.3.5 Cumulative Impacts and Mitigation Measures

- **REGIONAL AIR QUALITY EMISSIONS RESULTING FROM OPERATIONAL BUILDOUT OF THE PROPOSED PROJECT COULD IMPACT REGIONAL AIR QUALITY LEVELS ON A CUMULATIVELY CONSIDERABLE BASIS.**

Level of Significance Before Mitigation: Potentially Significant Impact.

Impact Analysis:

CRITERIA POLLUTANT

Construction-related emissions from future development under the proposed Project, similar to those discussed in the 2011 General Plan EIR, may be "cumulatively considerable" as they have the potential to be combined with the physical impacts of other past, present, or other probable future projects in the SCAB. If multiple large construction projects occur simultaneously in close proximity, it is possible that impacts associated with air quality violations could result from development of the project.

As described under earlier in this section, the proposed development under the proposed Project would reduce future operational emissions of criteria pollutants relative to future emissions under the 2011 General Plan. However, the overall magnitude of operational emissions at full build out of the proposed Project would contribute to the adverse air quality conditions in the SCAB. Because operations emissions could contribute to nonattainment designations and adverse health impacts to sensitive receptors, the land uses under the proposed Project would be cumulatively considerable.

SENSITIVE RECEPTORS

Exposure of TAC to sensitive receptors would be cumulative in nature if the project, in combination with other development, would expose sensitive receptors to a substantial concentration of TACs that would significant increase cancer risk, or acute or chronic health risks. As discussed under earlier in this section, although individual construction project details are unknown, the 2011 General Plan, proposed Project, and SCAQMD standards would avoid sensitive receptor exposure to TACs. In addition, the proposed Project land uses would result in a decrease in mobile source emissions and traffic concentrations would not exceed TAC thresholds. Therefore, no additional cumulative impacts would occur.

Impacts would be cumulative in nature if the project, in combination with cumulative development, would violate or contribute substantially to localized concentrations of CO

that exceed the CAAQS or NAAQS for CO. However, as mentioned earlier in this section, a long-term operational mobile-source emission of CO does not have the potential to violate or contribute substantially to local concentrations of CO.

ODORS

As discussed in the 2011 General Plan EIR, cumulative development would not result in potentially significant impacts in terms of objectionable odors affecting a substantial number of receptors due to the type of land uses proposed.

Construction and operations of the land uses proposed under the proposed Project are required to comply with the goals and policies in the 2011 General Plan, proposed Project, and SCAQMD standards for reducing impacts from criterial air pollutants and overall cumulative impacts. The cumulative impacts of the proposed Project would be consistent with the cumulative impact conclusions identified in the 2011 General Plan EIR. The proposed Project would not result in a new significant impact or a substantial increase in the severity of a previously identified significant cumulative impact.

Mitigation Measures: No mitigation measures beyond the goals and policies identified in the 2011 General Plan, the proposed Project and Mitigation Measures AQ 1 – AQ 24 are available.

Level of Significance After Mitigation: The cumulative impacts of the proposed Project would be consistent with the cumulative impact conclusions identified in the 2011 General Plan EIR; Significant Unavoidable Impacts for construction and regional air quality, Less than Significant for localized air quality and cumulative odor impacts. The proposed Project would not result in a new significant impact or a substantial increase in the severity of a previously identified significant cumulative impact.

4.3.6 Significant Unavoidable Impacts

The proposed Project would result in a significant unavoidable impact for the following areas:

- ***Short-Term Construction Emissions.*** Project-related emissions (associated with future development and infrastructure projects facilitated by the proposed Project) are anticipated to exceed SCAQMD thresholds, construction-related emissions are considered significant unavoidable.

- ***Long-Term Mobile and Stationary Source Emissions.*** Full buildout of the proposed Project's land uses would cause emissions to exceed SCAQMD's recommended thresholds, thus violating air quality standards and would contribute substantially to an existing or projected air quality violation. Because the ambient air quality standards are established to be protective of public health, adverse health impacts to receptors are anticipated due to the project's

emissions being above SCAQMD's thresholds. Review of individual developments are anticipated under the proposed Project to determine whether potential air pollutant emissions generated from growth could result in a significant impact to air quality. The significance level of these impacts would be determined during review and appropriate mitigation measures would be developed. However, due to the magnitude of development and associated mobile and stationary source air quality impacts, impacts in this regard would be significant unavoidable.

- ***Cumulative Short-Term Construction and Long-Term Mobile and Stationary Source Emissions Impacts.*** Even with implementation of the proposed Project goals and policies, and mitigation measures described in this section, emissions from operations of future development associated with implementation of the proposed Project would potentially exceed the SCAQMD thresholds for criteria pollutants, resulting in a significant impact. In accordance with SCAQMD methodology, any project that cannot be mitigated to a level of less than significant is also significant on a cumulative basis.

All other air quality impacts associated with implementation of the proposed Project would be less than significant by adherence to and/or compliance with goals and policies in the 2011 General Plan and proposed Project and the Mitigation Measures listed above (AQ 1 – AQ 24).

4.3.7 Sources Cited

Ascent Environmental, Draft Technical Memorandum: Air Quality and Greenhouse Gas Impact Analysis, August 2019.

Iteris, Traffic Impact Analysis, August 21, 2019.

VRPA, Memo, Murrieta General Plan Update VMT Analysis, August 16, 2019

City of Murrieta, City of Murrieta General Plan 2035, July 2011.

City of Murrieta, Environmental Impact Report, July 2011.

City of Murrieta Climate Action Plan Update, January 2020

4.4 Greenhouse Gas Emissions

This section identifies and analyzes the potential greenhouse gases (GHG) emissions associated with the proposed Project. As discussed in Section 3.0, Project Description, a major component of the proposed Project is to update emissions inventory, projections, targets, and GHG reduction strategies and measures per the City of Murrieta Draft Climate Action Plan (CAP) Update. As such, this section analyzes the GHG impacts of the Draft CAP Update. The information and analysis in this document are organized by a discussion of existing climate conditions, a summary of applicable regulations and a description of potential impacts of the proposed Project related to climate change. Refer to Appendix C, Revised Draft Technical Memo: Air Quality and Greenhouse Gas Impact Analysis, prepared by Ascent February 14, 2020, for the assumptions used in this analysis.

4.4.1 Regulatory Setting

Section 5.6.1 of the 2011 General Plan EIR described the regulatory framework for GHG emissions, many of which are still relevant in today's setting. However, since the certification of the 2011 General Plan EIR, there have been a number of changes or updates to regulations surrounding GHG emissions. These changes and/or updates are described below at the Federal, State and Local level:

FEDERAL

In October 2012, EPA and the National Highway Traffic Safety Administration, on behalf of the U.S. Department of Transportation, issued final rules to further reduce GHG emissions and improve corporate average fuel economy (CAFE) standards for light-duty vehicles for model years 2017 and beyond (77 Federal Register [FR] 62624). These rules would increase fuel economy to the equivalent of 54.5 miles per gallon, limiting vehicle emissions to 163 grams of CO2 per mile for the fleet of cars and light-duty trucks by model year 2025 (77 FR 62630). However, on April 2, 2018, the EPA administrator announced a final determination that the current standards are not appropriate and should be revised. It is not yet known what revisions will be adopted or when they will be implemented (EPA 2018).

In 2015, EPA unveiled the Clean Power Plan. The purpose of the plan was to reduce carbon dioxide (CO2) emissions from electrical power generation by 32 percent relative to 2005 levels within 25 years. EPA is proposing to repeal the Clean Power Plan because of a change to the legal interpretation of Section 111(d) of the federal Clean Air Act, on which the Clean Power Plan was based. The comment period on the proposed repeal closed April 26, 2018.

In June 2019, the EPA, under authority of the Clean Air Act section 111(d), issued the Affordable Clean Energy (ACE) rule which provides guidance to states on establishing emissions performance standards for coal-fired electric generating units (EGUs). Under this rule, states are required to submit plans to the EPA which demonstrate the use of specifically listed retrofit technologies and operating practices to achieve carbon dioxide reduction though heat rate improvement (HRI). HRI is a measurement of power plant efficiency that EPA determined as part of this rulemaking to be the best system of emissions reduction for carbon dioxide generated from coal fired EGUs (EPA 2019).

STATE

Statewide GHG Emission Targets and the Climate Change Scoping Plan

California's 2017 Climate Change Scoping Plan (2017 Scoping Plan), prepared by CARB, outlines the main strategies California will implement to achieve the legislated GHG emission target for 2030 and "substantially advance toward our 2050 climate goals" (CARB 2017:1, 3, 5, 20, 25–26). It identifies the reductions needed by each GHG emission sector (e.g., transportation, industry, electricity generation, agriculture, commercial and residential, pollutants with high global warming potential, and recycling and waste). CARB and other state agencies also released the 2030 Draft Natural and Working Lands Climate Change Implementation Plan consistent with the carbon neutrality goal of Executive Order B-55-18. The Plan furthers the state's goals through improving the carbon sequestration potential of the state's natural and working lands through improved soil health and forest management strategies.

The state has also passed more detailed legislation addressing GHG emissions associated with industrial sources, transportation, electricity generation, and energy consumption, as summarized below.

Cap-and-Trade Program

CARB administers the state's cap-and-trade program, which covers GHG emission sources that emit more than 25,000 metric tons of CO2 equivalent per year (MTCO2e/year), such as refineries, power plants, and industrial facilities. This market-based approach to reducing GHG emissions provides economic incentives for achieving GHG emission reductions.

Transportation-Related Standards and Regulations

As part of its Advanced Clean Cars program, CARB established more stringent GHG emission standards and fuel efficiency standards for fossil fuel–powered on-road vehicles. In addition, the program's zero-emission vehicle regulation requires battery, fuel cell, and plug-in hybrid electric vehicles to account for up to 15 percent of California's new vehicle sales by 2025 (CARB 2016b:15). By 2025, when the rules will

be fully implemented, GHG emissions from the statewide fleet of new cars and light-duty trucks will be reduced by 34 percent and cars will emit 75 percent less smog-forming pollution than the statewide fleet in 2016 (CARB 2016c:1).

Executive Order B-48-18, signed into law in January 2018, requires all state entities to work with the private sector to have at least 5 million zero-emission vehicles on the road by 2030, as well as 200 hydrogen fueling stations and 250,000 electric vehicle–charging stations installed by 2025. It specifies that 10,000 of these charging stations must be direct-current fast chargers.

Legislation Associated with Electricity Generation

The state has passed legislation requiring the increasing use of renewables to produce electricity for consumers. California utilities are required to generate 33 percent of their electricity from renewables by 2020 (SB X1-2 of 2011); 52 percent by 2027 (SB 100 of 2018); 60 percent by 2030 (also SB 100 of 2018); and 100 percent by 2045 (also SB 100 of 2018).

Building Energy Efficiency Standards (Title 24, Part 6)

The current California Energy Code (2016) is scheduled to be replaced by the 2019 standards on January 1, 2020. The 2019 California Energy Code will require builders to use more energy-efficient building technologies for compliance with increased restrictions on allowable energy use. Additionally, new residential units will be required to include solar panels, sized to offset the estimated electrical requirements of each unit (CCR, Title 24, Part 6, Section 150.1[c]14). CEC estimates that the combination of required energy-efficiency features and mandatory solar panels in the 2019 California Energy Code will result in new residential buildings that use 53 percent less energy than those designed to meet the 2016 California Energy Code. CEC also estimates that the 2019 California Energy Code will result in new commercial buildings that use 30 percent less energy than those designed to meet the 2016 standards, primarily through the transition to high-efficiency lighting (CEC 2018).

LOCAL

City of Murrieta

The City of Murrieta prepared a CAP as part of the 2011 General Plan. In February 2020, the City of Murrieta released a proposed Draft CAP Update. The purpose of the Draft CAP Update is to:

- Address new State and regional goals since the adoption of the City's 2011 CAP;
- Provide an updated baseline year of 2016;

- Provide emissions forecasts for 2030, 2035, and 2050 with GHG emission targets for 2030 and 2035;
- Analyze the changes to land use designations in the proposed Project.

As previously discussed, the Draft CAP Update is analyzed at a programmatic level under this SEIR, compliant with CEQA Guidelines, Section 15183.5. Through adoption of this SEIR, future project-specific environmental documents to tier from and/or incorporate by reference the programmatic review of the proposed Project. In addition, adoption of this SEIR the Draft CAP Update will be considered a "Qualified" CAP, as it will have undergone required environmental review.

4.4.2 Environmental Setting

The project site lies within the southern portion of the South Coast Air Basin (Basin). The Basin is a 10,743-square mile area bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east. The Basin includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties, in addition to the San Gorgonio Pass area in Riverside County. The Basin's terrain and geographical location (i.e., a coastal plain with connecting broad valleys and low hills) determine its distinctive climate.

The general region lies in the semi-permanent high-pressure zone of the eastern Pacific. The climate is mild and tempered by cool sea breezes. The usually mild climatological pattern is interrupted infrequently by periods of extremely hot weather, winter storms, or Santa Ana winds. The extent and severity of the air pollution problem in the Basin is a function of the area's natural physical characteristics (weather and topography), as well as man-made influences (development patterns and lifestyle). Factors such as wind, sunlight, temperature, humidity, rainfall, and topography all affect the accumulation and/or dispersion of pollutants throughout the Basin.

Physical Scientific Basis of Greenhouse Gas and Climate Change

Certain gases in the earth's atmosphere, classified as GHGs, play a critical role in determining the earth's surface temperature. Solar radiation enters the atmosphere from space. A portion of the radiation is absorbed by the earth's surface, and a smaller portion of this radiation is reflected toward space. The absorbed radiation is then emitted from the earth as low-frequency infrared radiation. The frequencies at which bodies emit radiation are proportional to temperature. The earth has a much lower temperature than the sun; therefore, the earth emits lower frequency radiation. Most solar radiation passes through GHGs; however, infrared radiation is absorbed by these gases. As a result, radiation that otherwise would have escaped back into space is instead "trapped," resulting in a warming of the atmosphere. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate on earth.

Prominent GHGs contributing to the greenhouse effect are CO2, methane (CH4), nitrous oxide (N2O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Human-generated emissions of these GHGs in excess of natural ambient concentrations are found to be responsible for intensifying the greenhouse effect and leading to a trend of unnatural warming of the earth's climate, known as global climate change or global warming. It is "extremely likely" that more than half of the observed increase in global average surface temperature from 1951 to 2010 was caused by the anthropomorphic increase in GHG concentrations and other anthropomorphic forcing (IPCC 2014:5). This warming is observable considering the 20 hottest years ever recorded occurred within the past thirty years (McKibben 2018).

Climate change is a global problem. GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants, which are pollutants of regional and local concern. Whereas most pollutants with localized air quality effects have relatively short atmospheric lifetimes (approximately one day), GHGs have long atmospheric lifetimes (one year to several thousand years). GHGs persist in the atmosphere long enough to be dispersed around the globe. Although the lifetime of any GHG molecule depends on multiple variables and cannot be determined with perfect certainty, it is understood that more CO2 is emitted into the atmosphere than is sequestered by ocean uptake, vegetation, and other forms of sequestration. Of the total annual human-caused CO2 emissions, approximately 55 percent are estimated to be sequestered through ocean and land uptake every year, averaged over the last 50 years, whereas the remaining 45 percent of human-caused CO2 emissions remain stored in the atmosphere (IPCC 2013:467).

The quantity of GHGs in the atmosphere responsible for climate change is not precisely known, but it is enormous. No single project alone would measurably contribute to an incremental change in the global average temperature or to global or local climates or microclimates. From the standpoint of CEQA, GHG impacts relative to global climate change are inherently cumulative.

GREENHOUSE GAS EMISSION SOURCES AND SINKS

As discussed previously, GHG emissions are attributable in large part to human activities. CO2 is the main byproduct of fossil fuel combustion. Methane, a highly potent GHG, primarily results from off-gassing (the release of chemicals from nonmetallic substances under ambient or greater pressure conditions) and is largely associated with agricultural practices, organic material decomposition in landfills, and the burning of forest fires (Black et al. 2017). Nitrous oxide emissions are largely attributable to agricultural practices and soil management. CO2 sinks, or reservoirs, include vegetation and the ocean, which absorb CO2 through sequestration and dissolution (CO2 dissolving into the water); respectively, these are the two of the most common processes for removing CO2 from the atmosphere.

The total GHG inventory for California in 2016 was 429 million metric tons of CO2 equivalents (MMTCO2e) (California Air Resources Board [CARB] 2018a). This is less than the 2020 target of 431 MMTCO2e equal to the inventory for 1990 (CARB 2018b:1). Table 4.4-1 summarizes the statewide GHG inventory for California.

Table 4.4-1
Statewide GHG Emissions by Economic Sector

Sector	Percent
Transportation	41
Industrial	23
Electricity generation (in state)	10
Electricity generation (imports)	6
Agriculture	8
Residential	7
Commercial	5
Not specified	<1
Source: CARB 2018a	

EFFECTS OF CLIMATE CHANGE ON THE ENVIRONMENT

According to the Intergovernmental Panel on Climate Change (IPCC), which was established in 1988 by the World Meteorological Organization and the United Nations Environment Programme, global average temperature will increase by 1.5 degrees Celsius (°C) (2.7 degrees Fahrenheit [°F]) by 2040. This 1.5 warming represents a global average indicating that portions of the earth will experience more dramatic warming than others. The oceans, which support a high specific heat, will experience less dramatic warming as compared to continents, particularly in inland regions.

According to California's Fourth Climate Change Assessment, if global GHGs are reduced at a moderate rate, California will experience average daily high temperatures that are warmer than the historic average by 2.5 °F from 2006 to 2039, by 4.4 °F from 2040 to 2069, and by 5.6 °F from 2070 to 2100; and if GHG emissions continue at current rates then California will experience average daily high temperatures that are warmer than the historic average by 2.7 °F from 2006 to 2039, by 5.8 °F from 2040 to 2069, and by 8.8 °F from 2070 to 2100 (Governor's Office of Planning and Research [OPR] 2019:23). The potential effects of this warming in California are well documented.

Since its previous climate change assessment in 2012, California has experienced several of the most extreme natural events in its recorded history: a severe drought from 2012-2016, an almost non-existent Sierra Nevada winter snowpack in 2014-2015, increasingly large and severe wildfires, and back-to-back years of the warmest average temperatures (OPR 2019:56). According to CNRA's Safeguarding California Plan: 2018 Update, California experienced the driest 4-year statewide precipitation on record from

2012 through 2015; the warmest years on average in 2014, 2015, and 2016; and the smallest and second smallest Sierra snowpack on record in 2015 and 2014 (CNRA 2018:55). In contrast, the northern Sierra Nevada experienced its wettest year on record during the 2016—2017 water year (CNRA 2018:64). The changes in precipitation exacerbate wildfires throughout California through a cycle of high vegetative growth coupled with dry, hot periods which lowers the moisture content of fuel loads. As a result, the frequency, size, and devastation of forest fires increases. In November 2018, the Camp Fire completely destroyed the town of Paradise in Butte County and caused 85 fatalities, becoming the State's deadliest fire in recorded history. Moreover, changes in the intensity of precipitation events following wildfires can also result in devastating landslides. In January 2018 following the Thomas Fire, 0.5 inches of rain fell over just 5 minutes in Santa Barbara causing destructive mudslides formed from the debris and loose soil left behind by the fire. These mudslides resulted in 21 deaths.

As temperatures increase, the amount of precipitation falling as rain rather than snow also increases, which could lead to increased flooding because water that would normally be held in the snowpack of the Sierra Nevada and Cascade Range until spring would flow into the Central Valley during winter rainstorm events. This scenario would place more pressure on California's levee/flood control system (CNRA 2018:190–192).

Temperature increases and changes to historical precipitation patterns will likely affect ecologically productivity. Existing habitats may migrate from climatic changes where possible into new areas, and those that lack the ability to retreat will be severely threatened. Changes in climatic conditions dramatically endanger the survival of arthropods which could have cascading effects throughout ecosystems (Lister and Garcia 2018). Conversely, a warming climate may support the populations of other insects such as ticks and mosquitos, which transmit diseases harmful to human health such as the Zika virus, West Nile virus, and Lyme disease (European Commission Joint Research Centre 2018).

Changes in temperature, precipitation patterns, extreme weather events, wildfires, and sea-level rise have the potential to threaten transportation and energy infrastructure, crop production, forests and rangelands, and public health (CNRA 2018:64, 116–117, 127; OPR 2019:63). The effects of climate change will also have an indirect adverse impact on the economy as more severe natural disasters cause expensive, physical damage to communities and the state.

Additionally, adjusting to the physical changes associated with climate change can produce mental health impacts such as depression and anxiety.

Cal-Adapt is a climate change scenario planning tool developed by the California Energy Commission (CEC) that downscales global climate model data to local and regional resolution under two emissions scenarios. The Representative Concentration Pathway (RCP) 8.5 scenario represents a business-as-usual future emissions scenario, and the RCP 4.5 scenario represents a future with reduced GHG emissions. According

to Cal-Adapt, annual average maximum temperatures in the project area are projected to rise by 5.9°F to 10.9°F by 2099, with the low and high ends of the range reflecting the lower and higher emissions increase scenarios (CEC 2019). Annual average minimum temperatures are expected to rise within a similar range.

The project area experienced an annual average high temperature of 73.3°F between 1961 and 1990. Under the RCP 4.5 scenario, the county's annual average high temperature is projected to increase by 5.2°F to 78.5°F by 2050 and increase an additional 0.7°F to 79.2°F by 2099 (CEC 2019). Under the RCP 8.5 scenario, the county's annual average high temperature is projected to increase by 5.6°F to 78.9°F by 2050 and increase an additional 5.0°F to 83.9°F by 2099 (CEC 2019).

The project area experienced an average precipitation of 24.2 inches per year between 1961 and 1990. Under the RCP 4.5 scenario, the county is projected to experience an increase of 9.2 inches to 33.4 inches per year by 2050 and decrease to 25.6 inches per year by 2099 (CEC 2019). Under the RCP 8.5 scenario, the project area is projected to experience an increase of 14.5 inches to 28.7 inches per year by 2050 and decrease to 28.7 inches per year by 2099 (CEC 2019).

GHG EMISSIONS INVENTORY METHODOLOGY

In California, some counties, cities, and air districts have developed guidance and thresholds of significance for determining significance of GHG emissions that occur within their jurisdiction. The City of Murrieta is the CEQA Lead Agency for the proposed Project and is; therefore, responsible for determining whether an impact would be considered significant. This analysis relies on the proposed Project's consistency with State GHG reduction targets to assess impacts.

To set the stage for how California would meet targets set forth by Assembly Bill (AB) 32, Senate Bill (SB) 32, Executive Order (EO) B-30-15, and EO S-3-05, the emissions inventory and targets developed in the baseline inventory were compared to the State reduction targets. To avoid a cumulative impact on climate change, the Statewide GHG reduction targets are as follows:

- 1990 levels by 2020 (AB 32)
- 40 percent below 1990 levels by 2030 (SB 32 and EO B-30-15)
- 80 percent below 1990 levels by 2050 (EO B-30-15 and S-3-05)

The necessary data are not available to estimate the City's 1990 emission level. Therefore, a baseline year of 2016 has been designated because it is the year with the most available data. Proportional targets for the baseline inventory were developed to express the level of GHG emissions reductions that would be needed locally between 2016 and future target years to demonstrate consistency with statewide targets. Thus, in order to stay consistent with the State's targets and to account for the City's 2016 inventory, the City's percent-based GHG reduction targets are matched with the state-

level reduction targets relative to a 2016 baseline. According to the inventories available from CARB, Statewide emissions from all sectors were approximately 431 million MTCO2e (MMTCO2e) in 1990 and 429 MMTCO2e in 2016 (CARB 2018). Thus, 2016 Statewide emissions were 2 MMTCO2e (0.37 percent) less than the 1990 level and the State's 2020 GHG target. Consequently, no further reductions from 2016 emissions levels are needed to reach the 2020 target of returning emissions to 1990 levels. To be consistent with the General Plan Update building out year, a target was established based on interpolation of the 2030 and 2050 targets. To avoid a cumulative impact on climate change, the City's GHG reduction targets are as follows:

- 2020 target: no reductions required
- 2030 target: 40 percent below 2016 levels
- 2035 target: 50 percent below 2016 levels
- 2050 target: 80 percent below 2016 levels

4.4.3 Significance Threshold Criteria

Since the certification of the 2011 General Plan EIR, there have been no changes to the CEQA significance criteria for greenhouse gas emissions. Per the CEQA Guidelines Section 15064 and relevant portions of Appendix G recommend that a lead agency consider a project's consistency with relevant, adopted plans, and discuss any inconsistencies with applicable regional plans, including plans to reduce GHG emissions. In Appendix G of the State CEQA Guidelines, two questions are provided to help assess if the project would result in a potentially significant impact on climate change.

The issues presented in the Initial Study Environmental Checklist (Appendix G of the *CEQA Guidelines*) have been utilized as thresholds of significance in this Section. Accordingly, greenhouse gas impacts resulting from the implementation of the proposed Project may be considered significant if they would result in the following:

- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.

- Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

Based on these standards the proposed Project's effects have been categorized as either "no impact," a "less than significant impact," or a "potentially significant impact." Mitigation measures are recommended for potentially significant impacts. If a potentially significant impact cannot be reduced to a less than significant level through the application of mitigation, it is categorized as a significant unavoidable impact.

4.4.4 Project Impacts and Mitigation Measures

GREENHOUSE GAS EMISSIONS

- **GREENHOUSE GAS EMISSIONS GENERATED BY DEVELOPMENT ASSOCIATED WITH IMPLEMENTATION OF THE PROPOSED PROJECT COULD HAVE A SIGNIFICANT IMPACT ON THE ENVIRONMENT.**

Level of Significance Before Mitigation: Potentially significant impact.

Impact Analysis:

As mentioned above in section 4.4.2, California has experienced several of the most extreme natural events in its recorded history since 2012, many of which are related to climate. At a state level, according to California's Fourth Climate Change Assessment, if GHG emissions continue at current rates then California will experience average daily high temperatures that are warmer than the historic average by 2.7 °F from 2006 to 2039, by 5.8 °F from 2040 to 2069, and by 8.8 °F from 2070 to 2100. Cal-Adapt is a climate change scenario planning tool developed by the California Energy Commission (CEC) that downscales global climate model data to local and regional resolution under two emissions scenarios. The Representative Concentration Pathway (RCP) 8.5 scenario represents a business-as-usual future emissions scenario, and the RCP 4.5 scenario represents a future with reduced GHG emissions. According to Cal-Adapt, annual average maximum temperatures in the project area are projected to rise by 5.9°F to 10.9°F by 2099, with the low and high ends of the range reflecting the lower and higher emissions increase scenarios (CEC 2019). Annual average minimum temperatures are expected to rise within a similar range.

The following climate change effects could potentially affect the City of Murrieta:

Natural Disasters

Climate change could result in increased flooding and weather-related disasters. As temperatures increase, the amount of precipitation falling as rain rather than snow also increases, which could lead to increased flooding because water that would normally be held in the snowpack of the Sierra Nevada and Cascade Range until spring would flow into the Central Valley during winter rainstorm events. This scenario would place more pressure on California's levee/flood control system

Wildfires

Climate change could result in increased occurrences and duration of wildfire events due to warmer temperatures, longer dry seasons, reduced winter precipitation, and early snowmelt. The changes in precipitation exacerbate wildfires throughout California through a cycle of high vegetative growth coupled with dry, hot periods which lowers the moisture content of fuel loads. As a result, the frequency, size, and devastation of forest fires increases.

Ecological Productivity

Temperature increases and changes to historical precipitation patterns will likely affect ecologically productivity. Existing habitats may migrate from climatic changes where possible to new areas, and those that lack the ability to retreat will be severely threatened. Changes to climatic conditions dramatically endanger the survival of arthropods which could have cascading effects throughout ecosystems (Lister and Garcia 2018).

Public Health

As mentioned above, changes in climate could impact and endanger certain species and alter existing habitats. Conversely, a warming climate may support the populations of other insects such as ticks and mosquitos, which transmit diseases harmful to human health such as the Zika virus, West Nile virus, and Lyme disease. Additionally, adjusting to the physical changes associated with climate change can produce mental health impacts such as depression and anxiety.

While the potential effects of climate change discussed above are a concern for society at large, implementation of City policies and regional, State, and Federal regulations regarding health and safety would lessen potential impacts to the City of Murrieta.

Projected Greenhouse Gas Emissions

The City's proposed Draft CAP Update includes a variety of strategies, measures, and actions to reduce GHG emissions in accordance with State reduction goals. Additionally, the proposed Draft CAP Update provides a 2016 baseline GHG emissions inventory; and GHG emissions forecasts for years 2030, 2035 (General Plan Update horizon year) and 2050. Table 4.4-2 summarizes the updated baseline and forecast year emissions.

Table 4.4-2
City of Murrieta Emissions Forecasts (MT CO_2e/yr)

	2016	2030	2035	2050
BAU Forecast	900,280	963,647	1,133,343	1,573,729
Percentage Change from 2016		26%	36%	75%
ABAU Forecast	900,280	878,357	815,174	875,589
Percentage Change from 2016		-9%	-9%	-3%
State Reduction Target (percent change from 2016)		40%	50%	80%
City of Murrieta Target Emissions		536,836	447,363	178,945
City of Murrieta Emissions with CAP		535,711	443,266	333,142

Notes: ABAU = legislative-adjusted business-as-usual, BAU = business-as-usual, CO_2e = carbon dioxide equivalents, N/A = Not Available, MT = metric tons

1 Based on the State's GHG inventory in 1990 and 2016. (CARB 2018a)
2 Interpolated between 2030 and 2050

The GHG Emissions Forecasts, in Table 4.4-2 above, summarizes the forecasted GHG emissions under "business-as-usual" (BAU) and legislative-adjusted BAU scenarios (ABAU). A BAU scenario is one in which no action is taken by local, State or federal agencies to reduce GHG emissions. A legislative-adjusted scenario is one in which BAU conditions are adjusted to reflect policy or regulatory actions enacted by State or federal agencies, but without considering any local actions to reduce GHG emissions. As indicated in Table 4.4-2, after implementation of State, federal, and local actions, the forecasted years still do not meet City goals to reduce its impact on climate change.

The emissions generated by development associated with the implementation of the proposed Project are inconsistent with statewide goals and CARB's 2017 Scoping Plan, which is a potentially significant impact. Mitigation Measure GHG-1 would ensure the approved Draft CAP Update provide measures to meet statewide climate goals.

Mitigation Measures:

GHG-1 The approved Draft CAP Update and General Plan Update shall identify strategies, measures, and actions that would be implemented to reduce GHG emissions consistent with State legislative requirements. The approved Draft CAP Update and General Plan Update shall include the following components in order to be consistent with CEQA Guidelines Section 15183.5:

GHG-1.1 Prepare community baseline GHG emission inventories and analyze the potential growth of these emissions over time;

GHG-1.2 Establish communitywide GHG emission reduction targets for forecasted years 2030, 2035 (General Plan Update horizon year) and 2050 consistent with guidance provided in SB 32;

GHG-1.3 Identify and evaluate strategies, measures, and actions to reduce community GHG emissions to comply with the established community GHG reduction targets;

GHG-1.4 Establish a comprehensive approach to reduce community GHG emissions by incorporating technologically feasible GHG emission reduction measures;

GHG-1.5 Establish a mechanism to monitor the plan's progress toward achieving the level and to require amendment if the plan is not achieving specified levels;

GHG-1.6 Provide a mechanism through which future projects may tier and streamline their analysis of GHG emissions pursuant to CEQA Guidelines Section 15183.5(b)(2); and

GHG-1.7 Be adopted in a public process following environmental review.

GHG-1.8 Upon adoption, the CAP will be monitored and progress for achieving targets will be reported on a regular basis as follows:

- Implementation Monitoring Report – prepared annually;
- Greenhouse Gas Emissions Inventory – updated every two years; and
- Climate Action Plan – updated every five years.

Level of Significance After Mitigation: The proposed Draft CAP Update and General Plan Update identifies strategies, measures, and actions that would be

implemented to reduce GHG emissions consistent with State legislative requirements, therefore with the implementation of the mitigation measures above, the GHG emissions generated by development associated with the implementation of the proposed Project would be less than significant.

4.4.5 Cumulative Impacts and Mitigation Measures

- **GREENHOUSE GAS EMISSIONS RESULTING FROM DEVELOPMENT ASSOCIATED WITH IMPLEMENTATION OF THE PROPOSED PROJECT AND CUMULATIVE DEVELOPMENT COULD IMPACT GREENHOUSE GAS EMISSIONS ON A CUMULATIVELY CONSIDERABLE BASIS.**

Level of Significance Before Analysis and Mitigation: Potentially significant impact.

Impact Analysis:

The issue of global climate change is inherently a cumulative issue, as the GHG emissions of individual projects cannot be shown to have any material effect on global climate. Thus, the proposed Project's impact to climate change is addressed only as a cumulative impact. The quantity of GHGs in the atmosphere responsible for climate change is not precisely known, but it is enormous. No single project alone would measurably contribute to an incremental change in the global average temperature or to global or local climates or microclimates. From the standpoint of CEQA, GHG impacts relative to global climate change are inherently cumulative.

As mentioned above, to avoid a cumulative impact on climate change, the City's GHG reduction targets are as follows:

- 2020 target: no reductions required
- 2030 target: 40 percent below 2016 levels
- 2035 target: 50 percent below 2016 levels
- 2050 target: 80 percent below 2016 levels

Per the emission forecast shown in Table 4.4-2 above, even after implementation of State, federal, and local actions, the forecasted years still do not meet City goals to reduce its impact on climate change. Therefore, the proposed Project's emissions are inconsistent with statewide goals and CARB's 2017 Scoping Plan, which is a potentially significant impact.

Mitigation Measures: Mitigation Measure GHG-1 as described above.

Level of Significance After Mitigation: The proposed Draft CAP Update identifies strategies, measures, and actions that would be implemented to reduce GHG emissions consistent with State legislative requirements. Therefore, with the implementation of the mitigation measures stated above and the adopted Draft CAP Update, GHG emissions generated by the proposed Project would be reduced to meet State GHG reduction targets. Therefore, after mitigation the level of significance would be less than significant.

4.4.6 Significant Unavoidable Impacts

As discussed in Section 4.4.4, GHG emissions impacts associated with implementation of the proposed Project would be less than significant by the adoption of the proposed Project. The Project as proposed identifies strategies, measures, and actions that could be implemented to reduce GHG emissions. With the adoption of the proposed Draft CAP Update and General Plan Update, no significant unavoidable GHG emissions impacts would occur as a result of buildout of the proposed Project.

4.4.7 Sources Cited

Ascent Environmental, *Draft Technical Memorandum: Air Quality and Greenhouse Gas Impact Analysis*, February 2020.

City of Murrieta, *City of Murrieta General Plan 2035,* July 2011.

City of Murrieta, *Environmental Impact Report,* July 2011.

4.5 Wildfire

This section identifies the existing fire protection services within the City of Murrieta and provides an analysis of potential impacts associated with the buildout of the proposed Project. Information in this section is based on information in the proposed Project Safety Element and information provided by Murrieta Fire & Rescue.

4.5.1 Regulatory Setting

Section 5.17 of the 2011 Certified EIR included a discussion of the regulatory setting related to fire protection in the City of Murrieta and Sphere of Influence. Since the Certification of the EIR, California adopted Senate Bill 1241 which revises the safety element requirements for state responsibility areas and very high fire hazard severity zones.

4.5.2 Environmental Setting

FIRE PROTECTION AND FACILITIES

Murrieta Fire & Rescue (MFR) is the primary provider of fire suppression and fire prevention services in the City of Murrieta, while the Sphere of Influence is served by the Riverside County Fire Department (RCFD). However, MFR participates in an Automatic Aid Agreement with the RCFD to expedite service delivery to the eastern portion of the City. MFR may also provide service to the Sphere by means of this Automatic Aid Agreement. MFR participates in the California Master Mutual Aid Agreement. In the event of a major fire, outside resources can be brought into the City as needed. MFR has five stations located to optimize response times throughout the City of Murrieta, listed in *Table 4.5-1*, *Murrieta Fire & Rescue Stations*, with a future sixth station in the eastern Sphere of Influence area (Exhibit 4.5-1 Fire Station Service Areas).

Table 4.5-1
Murrieta Fire & Rescue Stations

Station	Location
Fire Station No. 1	41825 Juniper Street
Fire Station No. 2	40060 California Oaks Road
Fire Station No. 3	39985 Whitewood Road
Fire Station No. 4	28155 Baxter Road
Fire Station No. 5	38391 Vineyard Parkway
Fire Station No. 6	Specific Location TBD

STAFFING

Firefighters are cross-trained to provide services for medical emergencies. All MFR personnel are trained to the level of Emergency Medical Technician (EMT) or are trained as Paramedics. MFR's engine companies are equipped for paramedic service. MFR maintains an Urban Search and Rescue (USAR) team of professional firefighters that are certified by the Federal Emergency Management Agency. They serve the larger community as part of California Task Force 6, supervised by the Riverside City Fire Department and composed of representatives from several Inland Empire fire agencies. The USAR team members regularly train with other agencies for rapid deployment to local, regional, and national incidents.

RESPONSE TIME AND ISO RATING

MFR has a total response time goal within the City of 6:04 minutes for medical emergencies and an effective response force (all resources dispatched to arrive at scene) for fire incidents of 10:24 minutes as measured by the National Fire Protection Association (NFPA) 1710 Standards and the Community Risk Assessment - Standards of Cover. Stations in the outlying regions experience longer average response times, such as the eastern portion of the City along Winchester Road and in the area between Winchester and the I-215 north of Clinton Keith. A sixth fire station in this area is contemplated to help achieve the target response time.

Insurance Services Office (ISO) rates fire department staffing and equipment, communications centers and water systems. The numeral classification rating is utilized to establish the community's residential, commercial and industrial insurance rates. For every decrease in one rating point, these insurance costs may decrease by approximately 10 percent. MFR's ISO rating is 4 in areas with fire hydrants and 9 in outlying areas that do not have water supply.

PROTECTION FOR HIGH-RISE BUILDINGS

As Murrieta develops with more Class A high-rise office buildings, further investments in MFR equipment and personnel are needed. An aerial truck company with a ladder extension of 100 feet or greater will be able to access and provide fire suppression for buildings such as Loma Linda University Medical Center-Murrieta.

FIRE PREVENTION

MFR participates in activities that are aimed at preventing fires and compliance with California Building Standards Code, Title 24, and the California Fire Code (California Code of Regulations, Title 24). MFR provides fire protection engineering, building inspections for code compliance, and hazardous materials inspections. MFR also provides education and training in public safety and emergency preparedness.

WILDLAND FIRES

A wildland fire is an uncontrolled fire spreading through vegetative fuels that may expose or consume structures. Although not located in a wilderness area, the threat of a wildland fire in or near Murrieta is high due to the wildland urban areas in and around the City, where structures and other human development meet or intermingle with wildland or vegetative fuels. The threat of wildfire is particularly significant during dry summer months and when there are strong Santa Ana winds. The fire season extends approximately five to six months, from late spring through fall. The aftermath of wildland fire produces new areas of potential landslide as burned and defoliated areas are exposed to winter rains.

The undeveloped hillside areas in and adjacent to the City present a potentially serious hazard due to the high potential for large scale wildland fires, as shown in Exhibit 4.5-2, Very High Fire Hazard Zones. The escarpments along the western boundary of the City are notorious for their threat of wildland fires that move quickly through the area. Similar wildland areas exist in northern Murrieta, in the Greer Ranch and Los Alamos areas. Within the City, wildland fires are assigned a severity rating of 3 and a probability rating of 2 in the Riverside County Multi-Jurisdictional Local Hazard Mitigation Plan.

There are a number of building criteria and site maintenance techniques available for MFR and property owners to use for areas within a Very High Fire Hazard Zone or areas described as Wildland Urban Interface areas, which are areas where structures and other human development meet and intermingle with undeveloped wildland or vegetative fuels. These techniques are detailed in the California Building Standards Code California Code of Regulations Title 24, Public Resources Code sections 4290 & 4291, and Government Code sections 51175-51189 and address topics such noncombustible siding for buildings and 100-foot fuel modification (buffer) zones. In addition, community planning, awareness, and involvement are proven elements of effectively reducing the occurrence of wildland fires and damage associated with them.

HIGH FIRE HAZARD ZONES

The MFR provides services that include fire prevention, suppression, planning and engineering, disaster preparedness, rescue services, and emergency medical services. The Sphere of Influence area is served by RCFD through a contract with with the California Department of Forestry and Fire Protection (CAL FIRE). The agencies also provide overlapping service under agreements for automatic aid and wild-land fire response. RCFD has experienced devastating fires in the wildland/urban interface area. Conditions of development are currently required, such as Class A roofing, noncombustible siding and 100-foot fuel buffer zones, to protect communities from wildland/urban interface fires. Additionally, other techniques, such as fuel modification and firebreaks, may be utilized to reduce the threat from wildland fires. Furthermore, community planning, awareness, and involvement are proven elements of effectively reducing the occurrence and damage associated with wildland fires.

FIRE FLOWS

The 2011 Certified EIR determined that water supply has been improved in areas that were identified in the Fire Protection Plan as lacking adequate fire flows, namely, historic Murrieta and Washington Avenue south of Murrieta Creek. Fire flows in these areas are no longer a concern due to upgrades done by the Western Municipal Water District.

4.5.3 Significance Threshold Criteria

According to the newly approved update to Appendix G of the CEQA Guidelines, a project would have a significant effect on the environment if the project is located in or near state responsibility areas or lands classified as very high fire hazard severity zones and would:

- Substantially impair an adopted emergency response plan or emergency evacuation plan
- Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire
- Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment
- Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes

While the Certified EIR analyzed fire protection in Section 5.17, it did not address the above items as the update to Appendix G of the CEQA Guidelines was subsequently approved on December 28, 2018.

4.5.4 Project Impacts and Mitigation Measures

SUBSTANTIALLY IMPAIR AN ADOPTED EMERGENCY RESPONSE PLAN OR EMERGENCY EVACUATION PLAN

Impact Analysis:

The City does not have defined evacuation routes. However, the City of Murrieta Emergency Operations Plan (EOP) addresses the planned response to extraordinary

emergency situations associated with natural disasters, national security emergencies, and technological incidents affecting the City of Murrieta. The objective of the EOP is to coordinate and incorporate all the facilities and personnel of the City into an efficient organization capable of responding effectively to all disasters and emergencies. It also facilitates multi-agency and multi-jurisdictional coordination, particularly between the City of Murrieta and Riverside County, special districts, and State agencies, in emergency operations. In addition, the City's Fire & Rescue Strategic Plan (Fiscal Years 2017-2020) defines the mission, vision, values, goals, and priority objectives of the MFR for Fiscal Years 2017-2018 which acts as a roadmap to guide MFR in responding to emerging challenges and opportunities.

Future development projects would be required to comply with the City's development review process including review for compliance with the City's Development Code. New developments associated with implementation of the proposed General Plan would be required to comply with all applicable fire code and ordinance requirements for construction and access to the site. Individual projects would be reviewed by the MFR to determine the specific fire requirements applicable to the specific development and to ensure compliance with these requirements. This would ensure that new developments would provide adequate emergency access to and from the site. Further, the City and the MFR would review any modifications to existing roadways to ensure that adequate emergency access or emergency response would be maintained. Additionally, emergency response and evacuation procedures would be coordinated through the City in coordination with the police and fire departments. Also, the proposed project includes existing and/or revised policies (SAF-3.5, SAF-4.2, SAF-5.1 and SAF-7.4) listed is Section 3.0/Project Description that will further help to identify strategies that ensure the capacity and resilience of escape routes. Therefore, the proposed Project does not substantially impair an adopted emergency response plan or emergency evacuation plan, resulting in less than significant impacts.

Mitigation Measures: No mitigation measures beyond the policies identified in the proposed Project are required.

Level of Significance After Mitigation: Not applicable

DUE TO SLOPE, PREVAILING WINDS, AND OTHER FACTORS, DEVELOPMENT ASSOCIATED WITH THE IMPLEMENTATION OF THE PROJECT COULD EXACERBATE WILDFIRE RISKS, AND THEREBY EXPOSE PROJECT OCCUPANTS TO POLLUTANT CONCENTRATIONS FROM A WILDFIRE OR THE UNCONTROLLED SPREAD OF A WILDFIRE

Impact Analysis:

Murrieta contains high fire hazard zones in the north and northeastern portions of the City as well as along its western boundary, as depicted on Exhibit 4.5-2 (Very High Fire Hazard Zones). Future development pursuant to the proposed Project may result in the development of the same vacant and underutilized land analyzed in the 2011 Certified EIR. Although the proposed Project would allow for an increase in 1,572 residential units, it also encompasses a decrease of 2,405,601 square feet in allowable non-residential uses.

Additionally, the proposed General Plan Safety Element policies that specifically address wildland fires (SAF-7.1 to SAF-7.5) have been revised to help to further reduce the incidence of damage to life and property from wildland fires as listed below. In addition, a new policy (SAF-7.6) directs the City to maintain and update its Very High Fire Hazard Severity Zones to maintain consistency with CAL FIRE's recommendations. In addition, Mitigation Measures FP-1 through FP-4 from the 2011 Certified EIR require the preparation of fuel modification plans and sufficient water supply during construction and are applicable here. Therefore, implementation of the proposed Project policies and the 2011 Certified EIR's mitigation measures (FP-1 through FP-4) would reduce impacts to a less than significant level.

Mitigation Measures Identified in the 2011 Certified EIR and Applicable to the Project

FP-1 The MFR shall review future development projects to determine if a Fuel Modification Plan is required. If required, project applicants shall prepare the Fuel Modification Plan in accordance with MFR requirements prior to the issuance of a grading or building permit.

FP-2 Brush clearance shall be conducted prior to initiation of construction activities in accordance with MFR requirements.

FP-3 Adequate access to all buildings on the project site shall be provided for emergency vehicles during the building construction process.

FP-4 Adequate water availability shall be provided to service construction activities.

Level of Significance After Mitigation: Less Than Significant Impact.

DEVELOPMENT ASSOCIATED WITH THE IMPLEMENTATION OF THE PROJECT COULD REQUIRE THE INSTALLATION OR MAINTENANCE OF ASSOCIATED INFRASTRUCTURE (SUCH AS ROADS, FUEL BREAKS, EMERGENCY WATER SOURCES, POWER LINES OR OTHER UTILITIES) THAT MAY EXACERBATE FIRE RISK OR THAT MAY RESULT IN TEMPORARY OR ONGOING IMPACTS TO THE ENVIRONEMNT

Impact Analysis:

The 2011 Certified EIR determined that buildout of the 2011 General Plan would result in additional demands on existing fire services, as individual projects are developed and associated increases in population are realized; new developments associated with the buildout of the 2011 General Plan would be required to comply with all applicable fire code and ordinance requirements for construction, access, water mains, fire flows, and hydrants. Individual projects would be reviewed by the MFR to determine the specific fire requirements applicable to the specific development and to ensure compliance with these requirements. This would ensure that new developments would not reduce the staffing, response times, or existing service levels within the City. The 2011 Certified EIR determined that adherence to the 2011 General Plan policies (SAF-5.1 – SAF-5.5 and SAF-6.1 through SAF-6.9) would reduce fire protection service impacts to a less than significant impact. The proposed Project includes revised and/or new policies (see Section 3.0/Project Description) to further reduce fire risk associated with the implementation of the proposed Project as listed below resulting in less than significant impacts.

Mitigation Measures: No mitigation measures beyond the policies identified in the proposed Project are required.

Level of Significance After Mitigation: Not applicable

DEVELOPMENT ASSOCIATED WITH THE IMPLEMENTATION OF THE PROJECT COULD EXPOSE PEOPLE OR STRUCTURES TO SIGNIFICANT RISKS, INCLUDING DOWNSLOPE OR DOWNSTREAM FLOODING OR LANDSLIDES, AS A RESULT OF RUNOFF, POST-FIRE SLOPE INSTABILITY, OR DRAINAGE CHANGES

Impact Analysis:

The 2011 Certified EIR determined that development associated with implementation of the 2011 General Plan would be subject to the City's Municipal Code. Chapter 15.56.040, Methods of Reducing Flood Loss, which establishes provisions to ensure damage from floods within the City is minimized. Chapter 15.16.070, General Provisions, and Chapter 15.56.120, Administration, establishes flood zones in accordance with FEMA, and administrative procedures regarding development within or around flood zones. Additionally, the 2011 General Plan Safety Element includes policies (SAF-3.1 – 3.6) to address flooding and flood hazards within the City. Additionally, the 2011 Certified EIR determined that the 2011 General Plan does not propose altering any drainage patterns. All applicable standards would be applied to future development projects to ensure that they are not constructed in a way that would alter a stream or river, or result in substantial erosion or flooding and that no mitigation measures beyond the policies identified in the 2011 General Plan are required.

Future development pursuant to the proposed Project may result in the development of the same land analyzed in the 2011 Certified EIR. Implementation of the proposed Project could expose people or structures to risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes. However, development associated with implementation of the proposed Project would be subject to the City's Municipal Code. Chapter 15.56.040, Chapter 15.16.070, Chapter 15.56.120, and the 2011 General Plan Safety Element policies (SAF-3.1 – 3.6) discussed above resulting in less than significant impacts. Additionally, the proposed Project includes three new policies (see section 3.0/Project Description) to further reduce risks.

Mitigation Measures: No mitigation measures beyond the policies identified in the proposed Project are required.

Level of Significance After Mitigation: Not applicable

4.5.5 Cumulative Impacts and Mitigation Measures

Level of Significance Before Mitigation: Less Than Significant Impact.

Impact Analysis:

Development associated with implementation of the proposed Project could be exposed to wildfire risks. However, future development pursuant to the proposed Project may result in the development of the same vacant and underutilized land analyzed in the 2011 Certified EIR. Additionally, the 2011 Certified EIR contains mitigation measures and the proposed Project includes policies that address wildland fires risks to further reduce the incidence of damage to life and property referenced in this section above. Therefore, implementation of the proposed Project policies and the 2011 Certified EIR's mitigation measures (FP-1 through FP-4) would reduce impacts to a less than significant level. The City would need to continue to consider impacts to wildfire services as part of the long-term planning process which it has done with the proposed Project which serves as a long-term planning document and anticipates future growth. As such, implementation of the proposed Project would not result in cumulatively considerable wildfire protection impacts.

Policies in the Proposed General Plan: Refer to the policies referenced above in this Section and/or Section 3.0/Project Description.

Mitigation Measures: Refer to the mitigation measures in this Section. No additional mitigation measures are required.

Level of Significance After Mitigation: Less than significant impact.

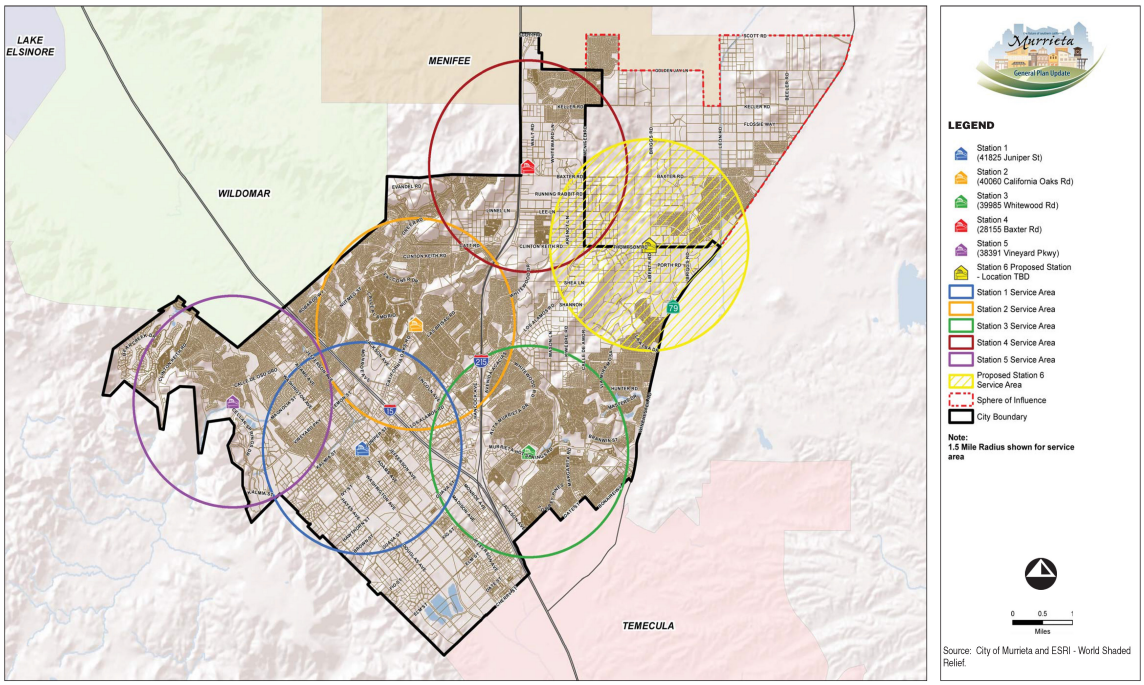
4.5.6 Significant Unavoidable Impacts

Wildfire protection impacts associated with implementation of the proposed Project would be less than significant by adherence to and/or compliance with policies in the proposed Project and recommended mitigation measures. No significant unavoidable wildfire protection impacts would occur as a result of buildout of the proposed Project.

4.5.7 Sources Cited

City of Murrieta Final General Plan EIR, July 2011.

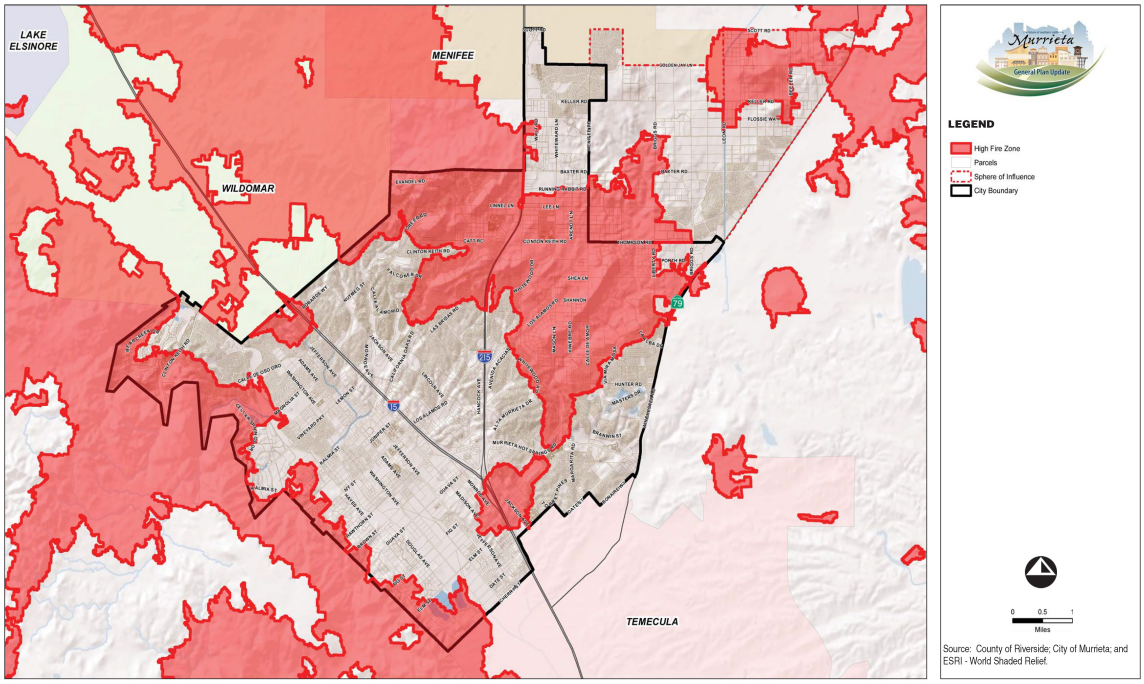
Proposed General Plan, August 2019 (Appendix H)



RBF CONSULTING

Fire Station Service Areas

Exhibit 4.5-1



RBF CONSULTING

High Fire Hazard Zones

Exhibit 4.5-2

5.0 Subject Areas Not Discussed in Detail

CEQA Guidelines Section 15128 requires that an EIR include a statement indicating the reasons that certain possible significant effects of a project were determined not to be significant and were therefore not discussed in detail. The 2011 Certified EIR included a discussion of impacts found not significant under Section 8.0, incorporated herein by reference.

The SEIR reviewed environmental impacts and mitigation measures for each subject area addressed in the 2011 Certified EIR to determine if the Project would result in significant changes and/or new impacts not previously addressed. This section summarizes the subject areas and impacts discussed in the 2011 Certified EIR that were not discussed in detail in the SEIR because they would not be affected by the proposed Project. The reasons these subject areas were found not to be significant in this SEIR are briefly described below.

5.1 Aesthetics, Light, and Glare

Section 5.3 of the 2011 Certified EIR evaluated visual quality within the City of Murrieta and Sphere of Influence and potential for visual impacts that could result from implementation of the 2011 General Plan. Visual impacts include long term and temporary changes in visual quality related to aesthetics, light, and glare.

The City and Sphere of Influence contain many natural visual resources, including mountain ranges, hillsides, low-lying valleys, and streams. The City's development pattern has largely been influenced by its transportation infrastructure system, which also contributes to its visual character and quality. Other aesthetic elements include the native vegetation present throughout the scenic hillsides and along stream corridors, strands of large trees, historic areas, and rural residential neighborhoods. Sensitive light and glare receptors in and around the City and the Sphere of Influence are generally represented by residential uses, natural wildlife habitat areas and wildlife corridors, and open space lands adjacent to existing or planned development.

The 2011 Certified EIR determined that future development pursuant to the 2011 General Plan would result in less than significant impacts to aesthetics, light, and glare, or potentially significant impacts that would be reduced less than significant after mitigation. More specifically, there would be less than significant impact to scenic vistas and scenic highways as future development under the 2011 General Plan would be subject to compliance with the regulations, guidelines, and development review process set forth in the City's development code, as well as Goals and Policies of the 2011

General Plan (Goals LU-1, LU-2, LU-3, LU-9, LU-10, LU-11, LU-12, LU-20, LU-21, LU-22, LU-24, LU-27, CSV-4, CSV-5, CSV-9, ROS-7; Policies LU-1.4, LU-2.1, LU-3.1, LU-3.2, LU-3.3, LU-3.4, LU-3.5, LU-9.1, LU-10.1, LU-10.2, LU-10.5, LU-10.7, LU-10.8, LU-10.9, LU-11.1, LU-11.2, LU-11.3, LU-11.4, LU-11.5, LU-11.6, LU-11.7, LU-11.8, LU-12.1, LU-12.2, LU-12.3, LU-12.4, LU-20.1, LU-20.2, LU-20.3, LU-20.4, LU-20.7, LU-20.8, LU-20.9, LU-21.1, LU-22.1, LU-22.2, LU-22.3, LU-22.4, LU-22.5, LU-24.1, LU-27.1, CSV-4.1, CSV-4.2, CSV-4.3, CSV-4.4, CSV-4.5, CSV-4.6, CSV-4.7, CSV – 5.1, CSV – 5.2, CSV-9.1, CSV-9.2, CSV-9.3, CSV-9.4, CSV-9.5, CSV-9.6, CSV-9.8, CSV-9.9, ROS-7.1, ROS-7.2, ROS 7.3, ROS-7.4) These regulations and guidelines are intended to diminish conflicts between urban development and visual resources, and preserve hills and ridges. Where permitted, development on hillsides within the City would involve careful siting, grading, and design in order to minimize exposure and preserve the City's vistas.

In addition, the 2011 Certified EIR determined that construction activities for future development pursuant to the 2011 General Plan could cause short term degradation to visual character due to the potential for exposed pads and staging areas for grading, excavation, and construction equipment, as well as temporary structures or associated construction debris. However, these construction related impacts would be short-term and temporary, proceed on a project-by-project basis, and employ measures such as temporary screening to relieve the visual distractions. Moreover, areas of construction would vary within the City such that areas of temporary visual distraction would change throughout the implementation of the 2011 General Plan. Mitigation Measures AES-1, AES-2, and AES-3, which would be incorporated into construction documents, would ensure that this impact would be reduced to a less than significant level.

No Changes or New Information Requiring Revision

The proposed Project does not change the potential impacts or mitigation measures discussed in the 2011 Certified EIR. Future development pursuant to the proposed Project may result in development of the same land that was analyzed in the 2011 Certified EIR with the same potential impacts to visual character resulting from future construction. Likewise, all future construction related impacts would be short-term and temporary, proceed on a project-by-project basis, and employ measures such as temporary screening to relieve the visual distractions. In addition, mitigation measures (AES-1, AES-2, and AES-3) related to minimizing the impact of construction on the surrounding community would be incorporated into all construction documents to ensure that any impacts would be reduced to less than significant levels. Therefore, no new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the 2011 Certified EIR. Thus, the proposed Project is consistent with the impacts identified in the 2011 Certified EIR and the level of impact (less than significant) remains unchanged from that cited in the 2011 Certified EIR.

Mitigation Measures Identified in the Certified EIR and Applicable to the Project

AES-1 For future development located in or immediately adjacent to residentially zoned properties, construction documents shall include language that requires all construction contractors to strictly control the staging of construction equipment and the cleanliness of construction equipment stored or driven beyond the limits of the construction work area. Construction equipment shall be parked and staged within the project site, as distant from the residential use, as reasonably possible. Staging areas shall be screened from view from residential properties.

AES-2 Construction documents shall include language requiring that construction vehicles be kept clean and free of mud and dust prior to leaving the development site. Streets surrounding the development site shall be swept daily and maintained free of dirt and debris.

AES-3 Construction worker parking may be located off-site with prior approval by the City. On-street parking of construction worker vehicles on residential streets shall be prohibited.

5.2 Agricultural Resources

Section 5.11 of the 2011 Certified EIR evaluated agricultural resources within the City of Murrieta and Sphere of Influence and potential impacts to such resources that could result from implementation of the 2011 General Plan. Most of the land classified as farmland in Murrieta is Farmland of Local Importance, concentrated in the southwest and northeast; or Grazing Land, primarily in the northeast. The majority of the Sphere of Influence is designated as either Farmland of Local Importance or Grazing Land. Several isolated parcels classified as Farmland of Statewide Importance or Prime Farmland are located in the southern portion of the City, west of I-15. Parcels classified as Unique Farmland are present in the northern area of the City. According to the California Department of Conservation, no Williamson Act encumbered properties are located within the City of Murrieta.

The 2011 Certified EIR determined that future development pursuant to the 2011 General Plan could result in no impact or less than significant impacts to agricultural resources. Specifically, it was determined that no Prime Farmland or Farmland of Statewide Importance was located within the Focus Areas targeted in the 2011 General Plan. Further, while some Unique Farmland was located within the boundaries of the Focus Areas in northern part of the City, agricultural uses would continue to be permitted on those sites. Finally, all future development pursuant to the 2011 General Plan would be require to comply with goals and policies of the Conservation and Land Use Elements (Goals CSV-10, LU-2, LU-20; Policies CSV-10.1, CSV-10.2, CSV-10.3, CSV-10.4, CSV-10.5, CSV-10.6, CSV-10.7, LU-2.1, LU-20.6, LU-20.7) which support

the protection of rural character and the continued potential for agricultural uses in rural residential areas, and also encourage additional, small-scale urban agricultural opportunities to be created throughout the City.

No Changes or New Information Requiring Revision

The proposed Project does not change the potential impacts or mitigation measures discussed in the 2011 Certified EIR. Future development pursuant to the proposed Project may result in the development of the same land analyzed in the 2011 Certified EIR and there is no additional farmland in the proposed Project area requiring analysis. Likewise, future development would be required to comply with applicable federal, state, and local regulations, relevant General Plan goals and policies, and mitigation measures. Therefore, no new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the 2011 Certified EIR. Thus, the proposed Project is consistent with the impacts identified in the 2011 Certified EIR and the level of impact (less than significant or no impact) remains unchanged from that cited in the 2011 Certified EIR.

Mitigation Measures Identified in the Certified EIR and Applicable to the Project

Not Applicable

5.3 Biological Resources

Section 5.10 of the 2011 Certified EIR evaluated biological resources within the City of Murrieta and Sphere of Influence and potential impacts to such resources that could result from implementation of the 2011 General Plan. A number of biological resources are located within the City and Sphere of Influence, including 54 species of plants and wildlife, 27 of which are Special Status Species (Listed) (i.e., Federal or State Endangered or Threatened or California Species of Special Concern), sensitive upland, wetland, and forest communities, and portions of the MSHCP Reserve Area wildlife corridor.

The 2011 Certified EIR determined that future development pursuant to the 2011 General Plan would result in less than significant impacts to biological resources, specifically relating to special status (listed) species, sensitive vegetation communities, including riparian habitat or federally protected wetlands, wildlife corridors, conflicts with local policies or ordinances protecting biological resources, and conflicts with the MSHCP. The analysis considered: listed, covered species; non-listed, covered species; and non-covered species, among other factors. It was determined that although development pursuant to the 2011 General Plan could result in development of vacant and underutilized parcels that may, directly or indirectly, impact biological resources, such future development would be subject to compliance with Murrieta's MSHCP Implementation Policy, the MSHCP, and General Plan goals and policies

(Goals LU-22, LU-25, CSV-3, CSV-4, CSV-5, CSV-8, CSV-9, ROS-7 Policies LU-22.3, LU-22.4, LU 25.1, CSV-3.5, CSV-4.1, CSV-4.3, CSV-4.4, CSV-4.5, CSV-4.6, CSV-8.1, CSV-8.2, CSV-8.3, CSV-8.4, CSV-8.5, CSV-8.6, CSV-9.1, ROS-7.1, ROS-7.2, ROS-7.3, ROS-7.4), in order to address potential impacts to biological resources. Additionally, due to the conceptual nature of the future development, proposals would require individual assessments of potential project-specific impacts to biological resources. If necessary, project-specific mitigation would be recommended to reduce potential impacts to a less than significant level.

No Changes or New Information Requiring Revision

The proposed Project does not change the potential impacts or mitigation measures discussed in the 2011 Certified EIR. Future development pursuant to the proposed Project may result in the development of the same vacant and underutilized land analyzed in the 2011 Certified EIR. Likewise, the impacts of future development projects would be evaluated on a case by case basis. And future development would be required to comply with applicable federal, state, and local regulations, relevant General Plan goals and policies, and mitigation measures. Therefore, no new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the 2011 Certified EIR. Thus, the proposed Project is consistent with the impacts identified in the 2011 Certified EIR and the level of impact (less than significant) remains unchanged from that cited in the 2011 Certified EIR.

Mitigation Measures Identified in the Certified EIR and Applicable to the Project
Not applicable.

5.4 Cultural Resources

Section 5.9 of the 2011 Certified EIR evaluated cultural resources within the City of Murrieta and Sphere of Influence and potential impacts to such resources that could result from implementation of the 2011 General Plan. Cultural resources are represented by the material remnants of human activity in an area and can be either prehistorical (aboriginal/native American) or historical (European and Euro-American). Within the City and the Sphere of Influence, 199 cultural resources have been documented. The significance of each of these resources was not identified, and instead requires consideration on a site- or resource-specific basis.

The 2011 Certified EIR determined that future development pursuant to the 2011 General Plan could result in potentially significant impacts to cultural resources through the development of vacant and underutilized land, which could unearth previously unknown cultural or tribal cultural resources. Thus, future development would be subject to compliance with General Plan 2035 Conservation Element and Land Use Element goals and policies (Goals CSV-9, CSV-11, LU-11, LU-22, LU-24; Policies CSV-9.1, CSV 11.1 – 11.9, LU 11.1, LU 11.7, LU 22.3 – 22.4, LU 24.1) and Mitigation Measures CR-1

through CR-3, ensuring that future development in the City would not adversely impact cultural resources, thereby concluding less than significant impacts.

Additionally, the 2011 Certified EIR determined that ground-disturbing activities in the City, such as grading or excavation associated with future development, have the potential to disturb as yet unidentified human remains. However, following compliance with State regulations, which detail the appropriate actions necessary in the event human remains are encountered, and compliance with General Plan 2035 Conservation Element goals and policies (Goal CSV-11; Policy CSV-11.5) and Mitigation Measures CR-2 and CR-3, impacts of the proposed Project were concluded to be less than significant.

No Changes or New Information Requiring Revision

The City mailed out 28 letters to Tribes to review the proposed Project in regards to Senate Bill 18 and Assembly Bill 52. Two tribal governments responded to these letters to enquire about the Project and both requested to initiate consultation. Consultation has been concluded with one Tribe and the other is still in consultation with City staff. The proposed Project does not change the potential impacts or mitigation measures discussed in the 2011 Certified EIR. Future development pursuant to the proposed Project may result in the development of the same vacant and underutilized land analyzed in the 2011 Certified EIR. Likewise, the impacts of future development projects would be evaluated on a case by case basis. And future development would be required to comply with applicable federal, state, and local regulations, relevant General Plan goals and policies, and mitigation measures. Therefore, no new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the 2011 Certified EIR. Thus, the proposed Project is consistent with the impacts identified in the 2011 Certified EIR and the level of impact (less than significant) remains unchanged from that cited in the 2011 Certified EIR.

Mitigation Measures Identified in the Certified EIR and Applicable to the Project

CR-1 Future development projects shall continue to be evaluated for cultural resources by the City of Murrieta through review by the Eastern Information Center (EIC) and notification of and consultation with the local tribes for new entitlement projects. The projects shall be evaluated for compliance with the California Environmental Quality Act (CEQA) and where feasible, avoidance of cultural resources. If, following review by the EIC and/or tribal consultation, it is determined that there is a potential for impacts to cultural resources, further cultural resources analysis by a qualified professional(s), as defined in Mitigation Measure CR-2, may be required by the City.

CR-2 In the event that cultural resources (archaeological, historical, paleontological) resources are inadvertently unearthed during excavation and grading activities of any future development project, the contractor shall cease all earth-disturbing

activities within a 100-foot radius of the area of discovery. If not already retained due to conditions present pursuant to Mitigation Measure CR-1, the project proponent shall retain a qualified professional (i.e., archaeologist, historian, architect, paleontologist, Native American Tribal monitor), subject to approval by the City of Murrieta to evaluate the significance of the find and appropriate course of action (refer to Mitigation Measures CR-1 and CR-3). If avoidance of the resources is not feasible, salvage operation requirements pursuant to Section 15064.5 of the CEQA Guidelines shall be followed. After the find has been appropriately avoided or mitigated, work in the area may resume.

CR-3 In the event that human remains are unearthed during excavation and grading activities of any future development project, all activity shall cease immediately. Pursuant to State Health and Safety Code Section 7050.5, no further disturbance shall occur until the County coroner has made the necessary findings as to origin and disposition pursuant to Public Resources Code Section 5097.98. If the remains are determined to be of Native American descent, the coroner shall within 24 hours notify the Native American Heritage Commission (NAHC). The NAHC shall then contact the most likely descendant of the deceased Native American, who shall serve as consultant on how to proceed with the remains.

5.5 Geology and Soils

Since the certification of the 2011 Certified EIR, a CEQA Guidelines update and approval by the Governor of Assembly Bill 52 (Chapter 532, Statutes 2014) resulted in the relocation of paleontological resource impact analysis from the cultural resource to the geological resource section of the Appendix G checklist. Section 5.08 of the 2011 Certified EIR evaluated geology and soil resources within the City of Murrieta and Sphere of Influence as well as potential impacts to such resources that could result from implementation of the 2011 General Plan. Paleontological resources were analyzed in Section 5.9, Cultural Resources, of the 2011 Certified EIR.

The 2011 Certified EIR identified several surficial deposits and/or bedrock units in the City based on published geologic maps, including artificial fill, colluvial deposits, young axial-channel deposits, young alluvial-valley deposits, pauba-sandstone, pauba-fanglomerate, basalt of the hogbacks, monzogranite to the granodiorite bedrock, gabbro bedrock, and metasedimentary rock. Hazards related to seismic activity were identified based on the City's proximity to known active fault zones, specifically the Elsinore Fault Zone, San Jacinto Fault Zone, Newport-Inglewood Fault Zone, and the San Andreas Fault Zone. The most common non-earthquake related geologic hazards to be encountered within the city were determined to include expansive soils, collapsed soils, loading settlement, subsidence, and hazardous minerals/radon.

The 2011 Certified EIR determined that future development pursuant to the 2011 General Plan could result in potentially significant impacts related to seismic, geologic, and soil conditions due to increased exposure of people and structures to potential

seismic and geologic hazards such as strong seismic groundshaking, earthquake-induced landslides, differential subsidence, ground fissuring, and liquefaction. Thus, future development would be subject to compliance with the California Building Standards Code (CBSC), Municipal Code, and Municipal National Pollutant Discharge Elimination System (NPDES) requirements, as well as the goals and policies of the 2011 General Plan Safety Element (Goals SAF-2, SAF-12; Policies SAF-2.1, SAF-2.2, SAF-2.3, SAF-12.1, SAF-12.2, SAF-12.3, SAF-12.4, SAF-12.5, SAF-12.6, SAF-12.7) and Mitigation Measures GEO-1 and GEO-2, set out below. In addition, potential impacts associated with future development would be evaluated on a project-by-project basis in accordance with CEQA. If a specific site were determined to create a significant impact that could not be feasibly mitigated, the site would not be appropriate for development. This process, along with compliance with Federal and State laws, local building codes, and public safety standards would result in less than significant impacts related to potential seismic, geologic, and soil hazards.

No Changes or New Information Requiring Revision

The proposed Project does not change the potential impacts or mitigation measures discussed in the 2011 Certified EIR. Future development pursuant to the Project may result in the development of the same land analyzed in the 2011 Certified EIR, causing increased exposure of people and structures to potential seismic and geologic hazards. Likewise, the impacts of future development projects would be evaluated on a case by case basis and would be required to comply with applicable federal, state, and local regulations, relevant General Plan goals and policies, and mitigation measures. Therefore, no new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the 2011 Certified EIR. Thus, the proposed Project is consistent with the impacts identified in the 2011 Certified EIR and the level of impact (less than significant) remains unchanged from that cited in the 2011 Certified EIR.

Mitigation Measures Identified in the Certified EIR and Applicable to the Project

GEO-1 Prior to issuance of a Grading Permit for each future development project, a registered geologist or soils engineer shall prepare an area-specific Geologic Study, which shall be submitted to the Public Works or Building and Safety Department for approval. The Geologic Study shall specify the measures necessary to mitigate impacts related to fault rupture, groundshaking, landslides, liquefaction or dynamic settling, expansive or collapsible soils, lateral spreading, and other geologic and seismic hazards, if any. All recommendations in the Geologic Study shall be implemented during area preparation, grading, and construction.

GEO-2 Prior to issuance of any Grading Permit, project applicants of future development projects shall comply with each of the recommendations detailed in the Geotechnical Study, and other such measure(s) as the City

deems necessary to adequately mitigate potential seismic and geotechnical hazards.

5.6 Hazardous Materials

Section 5.14 of the 2011 Certified EIR evaluated hazardous materials within the City of Murrieta and Sphere of Influence and potential impacts of such hazardous materials that could result from implementation of the 2011 General Plan. The term "hazardous material" includes any material that, because of its quantity, concentration, or physical, chemical, or biological characteristics, poses a considerable present or potential hazard to human health or safety, or to the environment. It refers generally to hazardous chemicals, radioactive materials and biohazards materials. "Hazardous waste," a subset of hazardous material, is material that is to be abandoned, discarded, or recycled and includes chemicals, radioactive and bio-hazardous waste, including medical waste.

Hazardous substance incidents are likely to occur within the City of Murrieta due to the multitude of transportation systems (highways and railways) that traverse the City as well as the many businesses, including agricultural businesses, within and around the City that handle, transport, and/or store hazardous materials. The City also contains 35 regulatory properties listed on the GeoTracker database as leaking underground fuel tank (LUFT) sites. In addition, the French Valley Airport is located adjacent to the City's eastern boundary. Portions of the City are located within Zone B1, Zone C, Zone D, Zone E, and the height review overlay zone.

The 2011 Certified EIR determined that future development pursuant to the 2011 General Plan could result in potentially significant impacts from hazardous materials due to an increase in population which may increase demand on public health and safety services in the City. Additionally, future non-residential development pursuant to the 2011 General Plan may consist of additional facilities that use, store, produce or transport hazardous wastes, and therefore would utilize City and County health and safety services and increased exposure to residents who may also be employees of those businesses. However, as the 2011 General Plan did not involve any specific development projects, no specific types of hazards could be identified and the likelihood of a hazard presenting a serious health or safety hazard/risk to the public could not be determined. Compliance with measures established by Federal, State and local regulatory agencies is considered adequate to offset the negative effects related to the use, storage and transport of hazardous materials in the City. In addition, goals and policies in the 2011 General Plan Safety Element and Land Use Element (Goal SAF-1, SAF-8; LU-25 Policies SAF-1.2, SAF-1.3, SAF-1.5, SAF-8.1, SAF-8.2, SAF-8.4, SAF-8.5, SAF-8.6, SAF-8.7, SAF-8.8, SAF-8.9, SAF-8.10, SAF-8.11, SAF-8.12, SAF-8.13, SAF-8.14, LU-25.8, LU-25.9, U-25.10, LU-25-11, LU-25.12) as well as the recommended mitigation measures, would further reduce hazardous materials impacts to a less than significant level.

In addition, the 2011 Certified EIR determined that structures and individuals within the flight pattern of the French Valley Airport could be subjected to the potential of off-airport accidents and additional noise. However, the 2011 General Plan did not recommend any land use changes for the areas within the French Valley Airport Compatibility Zones. Further, land use restrictions for each of the compatibility zones provide the necessary limitations to reduce the potential impacts of off-airport accidents to persons and property on the ground while specific land use regulations regarding FAA notification imaginary surfaces, aircraft noise, and building heights have been implemented to reduce impacts of aircraft overflight to a less than significant level.

No Changes or New Information Requiring Revision

The proposed Project does not change the potential impacts or mitigation measures discussed in the 2011 Certified EIR. Future development pursuant to the proposed Project may result in the development of the same land analyzed in the 2011 Certified EIR, causing potential increase in impacts from hazardous materials. Likewise, the impacts of future development projects would be evaluated on a case by case basis and would be required to comply with applicable federal, state, and local regulations, relevant General Plan goals and policies, and mitigation measures. Therefore, no new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the 2011 Certified EIR. Thus, the proposed Project is consistent with the impacts identified in the 2011 Certified EIR and the level of impact (less than significant) remains unchanged from that cited in the 2011 Certified EIR.

Mitigation Measures Identified in the Certified EIR and Applicable to the Project

HHM-1 The Community Development Department, in cooperation with the Murrieta Fire & Rescue and the Riverside County Community Health Agency, Materials Management Division, shall provide information to businesses on viable alternatives to hazardous materials. Create an informational pamphlet with existing hazardous material substitutions and retailers that sell the materials. Offer the information to applicable business owners who are required to file as a hazardous waste handler in the City.

HHM-2 The Community Development Department, in cooperation with the Murrieta Fire & Rescue and the Riverside County Community Health Agency, Materials Management Division, provide information on viable alternatives to household hazardous materials on the City's website so households may use alternatives. Information will also educate the public to the health, safety, and environmental benefits of using non-hazardous substitutions.

HHM-3 Prior to development approval on a project-by-project basis, the project applicant shall confirm the presence or absence of hazardous materials pertaining to the release of hazardous materials into the soil, surface water,

and/or groundwater. If necessary, development shall undergo site characterization and remediation on a project-by-project basis, per applicable Federal, State, and/or local standards and guidelines set by the applicable regulatory agency.

HHM-4 The project applicant shall comply with the requirements of the Federal Aviation Administration (FAA) should any portions of the development be within a height overlay review zone or encroach within an imaginary surface surrounding the French Valley Airport. A Notice of Proposed Construction or Alteration (Form 7460-1) may be required by the FAA in accordance with Federal Aviation Regulations Part 77.

5.7 Mineral Resources

Section 5.12 of the 2011 Certified EIR evaluated mineral resources within the City of Murrieta and Sphere of Influence and potential impacts to such resources that could result from implementation of the 2011 General Plan. Within the City, five mineral resource sites were identified, containing clay, sand and gravel, feldspar, feldspar/silica, and gold. One geothermal resource was also identified. Within the Sphere of Influence, three mineral resource sites were identified containing feldspar, gold, and stone (crushed/broken). According to the State of California Department of Conservation DOGGR, no underlying oil fields were present in the General Plan Planning Area, or in outlying areas.

The 2011 Certified EIR evaluated the significance of mineral resources within the City and Sphere of Influence using the State Mining and Reclamation Act of 1975 (California Public Resources Code Section 2710 et seq.) (SMARA) MRZ classification system. Mineral resources within the City and Sphere of Influence were classified as follows:

- For industrial materials, the City and its Sphere of Influence are classified as MRZ-4, an area of unknown mineral resource significance.
- For aggregate resources, most of the City and the Sphere of Influence are classified as MRZ-3a, an area containing known mineral occurrences of undetermined mineral resource significance.
- Land west of I-15 is classified as MRZ-1, an area of no mineral resource significance.

MRZ-3a areas are considered to have a moderate potential for the discovery of economic mineral deposits. The MRZ-3 classification indicates potentially significant mineral deposits that can be reclassified as significant mineral deposits through either a petition or regular periodic review by the State. This reclassification can occur in the

event of a change in the mineral resources, or if a threat to the extraction of mineral deposits develops.

The 2011 Certified EIR determined that development pursuant to the 2011 General Plan would result in less than significant impacts to mineral resources. This is because it is unknown, and therefore unlikely, that the MRZ-4 area contains significant mineral resources, and while the MRZ-3a classification represents an area that has the potential for mineral deposits, no resources have yet been identified. Similarly, while mineral resources have been identified within the City and Sphere of Influence, no mineral resource recovery sites are known to exist. Therefore future development pursuant to the 2011 General Plan is not anticipated to result in the loss of availability of a known mineral resource or impacts to mineral resource recovery sites. In addition, the 2011 Certified EIR determined that future development pursuant to the 2011 General Plan would be subject to compliance with the City's Development Code, which includes provisions for the regulation of surface mining operations, as well as Conservation Element goals and policies (Goal CSV-6; Policy CSV-6.1), ensuring that future development in the City would not adversely impact mineral resources. No mitigation measures were required.

No Changes or New Information Requiring Revision

The proposed Project does not change the potential impacts or mitigation measures discussed in the 2011 Certified EIR. Future development pursuant to the proposed Project may result in the development of the same land analyzed in the 2011 Certified EIR, the same potential for mineral deposits exists, and no new resources have been identified. In addition, future development would be required to comply with applicable federal, state, and local regulations and relevant General Plan goals and policies. Therefore, no new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the 2011 Certified EIR. Thus, the proposed Project is consistent with the impacts identified in the 2011 Certified EIR and the level of impact (less than significant) remains unchanged from that cited in the 2011 Certified EIR.

Mitigation Measures Identified in the Certified EIR and Applicable to the Project
Not Applicable.

5.8 Noise

Section 5.7 of the 2011 Certified EIR summarized the existing noise conditions within the City of Murrieta and Sphere of Influence, and evaluated potential impacts to such conditions that could result from the implementation of the 2011 General Plan. Sources of noise include mobile sources such as freeways and streets, aircraft, and railways, as well as stationary sources such as construction, commercial, and industrial facilities. Noise measurements were taken throughout the City of Murrieta at 10 locations, selected as representative samples of the more urbanized portions of the City.

The 2011 Certified EIR determined that future development pursuant to the 2011 General Plan would result in less than significant impacts after mitigation. Future development pursuant to the 2011 General Plan would generate varying degrees of noise and groundborne vibration during construction activities. The extent and timing of future construction activities within the City were unknown at the time of the 2011 Certified EIR, however, it was determined unlikely that the City would experience intensive construction activity with implementation of the 2011 General Plan. In addition, it was determined that future development pursuant to the 2011 General Plan would generate additional traffic and would potentially increase ambient noise levels at existing land uses along roadways. Actual noise exposure levels would vary depending on a combination of factors, such as variation in daily traffic volumes, shielding provided by existing and proposed structures, and meteorological conditions.

Future development pursuant to the 2011 General Plan would be required to comply with all applicable federal, state, and local regulations as well as 2011 General Plan goals and policies (Goals N-1, N-2, N-3, N-4, LU-25; Policies N-1.1, N-1.2, N-1.3, N-1.4, N-2.1, N-2.2, N-2.3, N-2.4, N-2.5, N-2.6, N-2.7, N-2.8, N-2.9, N-2.10, N-3.1, N-3.2, N-3.3, N-3.4, N-3.5, N-3.6, N-4.1, N-4.2, N-4.3, N-4.4, N-4.5, N-4.6, LU-25.2, LU-25.3, LU-25.8, LU-25.9). In addition, future development projects would be individually reviewed for project specific impacts. If project-specific significant impacts are identified, specific mitigation measures would be placed on the project as conditions of approval to ensure compliance with the appropriate land use compatibility criteria. Thus the 2011 Certified EIR concluded that any impacts related to noise would be reduced to less than significant levels with mitigation.

No Changes or New Information Requiring Revision

The proposed Project does not change the potential impacts or mitigation measures discussed in the 2011 Certified EIR. Future development pursuant to the proposed Project may result in the development of the same vacant and underutilized land analyzed in the 2011 Certified EIR. This may create additional noise and vibrations related to future construction and impact long-term ambient noise conditions from mobile and stationary sources. As in the 2011 Certified EIR, future development pursuant to the proposed Project would continue to be reviewed on an individual basis for project-specific significant impacts. If project-specific impacts are identified, specific mitigation measures would be placed on the project as conditions of approval. In addition, all future development would be required to comply with applicable federal, state, and local regulations, relevant General Plan goals and policies, and mitigation measures. Therefore, no new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the 2011 Certified EIR. Thus, the proposed Project is consistent with the impacts identified in the 2011 Certified EIR and the level of impact (less than significant) remains unchanged from that cited in the 2011 Certified EIR.

Mitigation Measures Identified in the Certified EIR and Applicable to the Project

NOI-1 The City shall require future developments to implement the following measures to reduce the potential for human annoyance and architectural/structural damage resulting from elevated groundborne noise and vibration levels.

- Pile driving within a 50-foot radius of historic structures shall utilize alternative installation methods where possible (e.g., pile cushioning, jetting, predrilling, cast-in-place systems, resonance-free vibratory pile drivers).
- The preexisting condition of all designated historic buildings within a 50-foot radius of proposed construction activities shall be evaluated during a preconstruction survey. The preconstruction survey shall determine conditions that exist before construction begins for use in evaluating damage caused by construction activities. Fixtures and finishes within a 50-foot radius of construction activities susceptible to damage shall be documented (photographically and in writing) prior to construction. All damage shall be repaired back to its preexisting condition.
- Vibration monitoring shall be conducted prior to and during pile driving operations occurring within 100 feet of the historic structures. Every attempt shall be made to limit construction-generated vibration levels in accordance with Caltrans recommendations during pile driving and impact activities in the vicinity of the historic structures.

NOI-2 Residential projects located within the 55 CNEL noise contour for the French Valley Airport shall be subject to review by the Riverside County Airport Land Use Commission and shall be required to ensure interior noise levels from aircraft operations are at or below 45 dB CNEL.

5.9 Population, Housing, and Employment

Section 5.2 of the 2011 Certified EIR identified the existing population, housing, and employment statistics for the City of Murrieta and evaluated potential impacts that could result from implementation of the 2011 General Plan. More specifically, the impact analysis evaluated how buildout of the 2011 General Plan would induce population growth in the city, both directly and indirectly, using data from the Southern California Association of Governments (SCAG), U.S. Census 1990 and 2000, and California Department of Finance.

The 2011 Certified EIR determined that buildout of the 2011 General Plan could result in development potential of approximately 44,484 DU and a population projection of approximately 133,452 persons. The non-residential (i.e. commercial, industrial, etc.) land use development potential was estimated at approximately at 50.2 million square

feet with an employment projection of approximately 130,153 jobs. This would result in an increase of approximately 10,734 DU and 32,199 persons and 110,275 jobs.

The 2011 Certified EIR determined that future development pursuant to the 2011 General Plan would result in less than significant impacts to population, employment and housing. While, overall the population growth would be approximately 32 percent over existing conditions, future development would be subject to compliance with the regulations, guidelines, and development review process set forth in the City's development code, as well as Goals, and Policies of the 2011 General Plan (Goals LU-1, ED-2, ED-5; Policies LU-1.1, LU-1.2, LU-1.3, LU-1.4, LU-1.5, LU-1.6, LU-1.7, LU-1.8, LU-1.9, ED-2.6, ED-2.7, ED-2.8, ED-2.9, ED-5.1, ED-5.2, ED-5.3, ED-5.4, Housing Element Policies 1.1, 1.6, 5.1, 5.2, 5.5). Additionally, the city's growth level would remain generally consistent with SCAG's growth forecasts.

No Changes or New Information Requiring Revision

While the proposed Project would increase the number of dwelling units by 1,572, there would also be a reduction of 2,405,601 square feet of non-residential uses. As such, the growth forecast between the prior 2011 General Plan and the proposed Focused General Plan Update is relatively consistent. Therefore, these changes are not likely to induce a substantial population growth from that which was analyzed in the Certified EIR.

Mitigation Measures Identified in the Certified EIR and Applicable to the Project

Not applicable.

5.10 Public Resources

FIRE PROTECTION

Section 5.17, Fire Protection, of the 2011 Certified EIR included an analysis of fire protection services within the City of Murrieta and Sphere of Influence, and evaluated potential impacts to such services that could result from implementation of the 2011 General Plan. A wildland fire is an uncontrolled fire spreading through vegetative fuels that may expose or consume structures. Although not located in a wilderness area, the threat of a wildland fire in or near Murrieta is high due to the wildland urban areas in and around the City, where structures and other human development meet or intermingle with wildland or vegetative fuels. The undeveloped hillside areas in and adjacent to the City present a potentially serious hazard due to the high potential for large scale wildland fires, as shown in Exhibit 4.5-2, High Fire Hazard Zones.

The 2011 Certified EIR determined that the 2011 General Plan would result in less than significant impact to fire protection services after mitigation. Fire protection levels would

be considered adequate if existing emergency response time and staffing levels could be maintained and if the Murrieta Fire & Rescue (MFR) fire service standards and fire flow requirements are met. The MFR indicated that the 2011 General Plan would not create significant changes to its services and did not recommend any mitigation measures beyond the goals and policies in the 2011 General Plan and existing regulations. Further, while future development pursuant to the 2011 General Plan and the associated increases in population would result in additional demands on existing fire services, this development would be required to comply with all applicable fire code and ordinance requirements for construction, access, water mains, fire flows, and hydrants, as well as 2011 General Plan goals and policies (Goals SAF-5, SAF-6; Policies SAF-5.1, SAF-5.2, SAF-5.3, SAF-5.4, SAF-5.5, SAF-6.1, SAF-6.2, SAF-6.3, SAF-6.4, SAF-6.5, SAF-6.6, SAF-6.7, SAF-6.8, SAF-6.9,). Individual projects would be reviewed by the MFR to determine the specific fire requirements applicable to the specific development and to ensure compliance with these requirements. This would ensure that new developments would not reduce the staffing, response times, or existing service levels within the City.

In addition, the 2011 Certified EIR determined that while areas targeted for new development or intensification of development were not located within designated high fire hazard zones, areas throughout the city, including those targeted for development still have the potential to be subject to large scale wildland fire hazards. The MFR requires development, as part of a project's conditions of approval, to install Class A roofing, noncombustible siding, and/or 100-foot fuel buffer zones to protect communities form wildland/urban interface fires. Further, 2011 General Plan goals and policies (Goal SAF-7; Policies SAF-7.1, SAF-7.2, SAF-7.3, SAF-7.4, SAF-7.5) specifically address wildland fires. This coupled with Mitigation Measures FP-1 through FP-4 (below) reduce impacts to a less than significant level. Therefore, the 2011 Certified EIR determined that implementation of the 2011 General Plan would result in a less than significant impact to fire protection services.

No Changes or New Information Requiring Revision

The proposed Project does not change the potential impacts discussed in the 2011 Certified EIR for fire protection services. Future development pursuant to the proposed Project may result in the development of the same vacant and underutilized land analyzed in the 2011 Certified EIR. Likewise, the impacts of future development projects would be evaluated on a case by case basis. Although the proposed Project would allow for an increase in residential uses, it also encompasses a decrease in allowable non-residential uses. In addition, future development pursuant to the proposed Project would be required to comply with all applicable federal, state, and local regulations and General Plan goals and policies as well as all identified mitigation measures. Therefore, no new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the 2011 Certified EIR and the level of impact (less than significant) remains unchanged from that cited in the 2011 Certified EIR.

Since the 2011 Certified EIR, the State has passed new legislation (Senate Bill 1241) regarding fire hazard planning and mitigation. SB 1241 revises the Safety Element requirements for state responsibility areas and very high fire hazard severity zones and require the Safety Element to be reviewed and updated as necessary to address the risk of fire in state responsibility areas and very high fire hazard severity zones. The proposed Project incorporates additional policies (see Section 3.0 Project Description) into the Safety Element in order to address the requirements of SB 1241.

Mitigation Measures Identified in the Certified EIR and Applicable to the Project

FP-1 The MFR shall review future development projects to determine if a Fuel Modification Plan is required. If required, project applicants shall prepare the Fuel Modification Plan in accordance with Fire Department requirements prior to the issuance of a grading or building permit.

FP-2 Brush clearance shall be conducted prior to initiation of construction activities in accordance with MFR requirements.

FP-3 Adequate access to all buildings on the project site shall be provided for emergency vehicles during the building construction process.

FP-4 Adequate water availability shall be provided to service construction activities.

POLICE PROTECTION

Section 5.18, Police Protection, of the 2011 Certified EIR included an analysis of police protection services within the City of Murrieta and evaluated potential impacts to such services that could result from implementation of the 2011 General Plan. The Police Department (Department) is organized into two main Divisions: Operations and Support. The Operations Division includes Traffic, Patrol, and officers who oversee several other types of programs. The Support Services Division includes Code Enforcement, Investigation, the Records Bureau, the Special Enforcement Team, the Dispatch Center, and programs geared towards youth and schools.

The 2011 Certified EIR determined that the General Plan buildout would occur over a 25-year period and the Murrieta Police Department would effectively plan for increases in population and police protection service demand. The following goals and policies in the 2011 General Plan (Safety Element Goals SAF-9, SAF-10, SAF-11 and their associated policies), and continued collection of DIF Fees would reduce impacts resulting from the General Plan 2035 to a less than significant level. No service shortfall requiring additional personnel or equipment is anticipated as a result of the implementation of the proposed 2011 General Plan. It was further determined that no mitigation measures beyond the goals and policies identified in the 2011 General Plan were required.

No Changes or New Information Requiring Revision

The proposed Project does not change the potential impacts discussed in the 2011 Certified EIR for police protection services. Although the proposed Project would allow for an increase in residential uses, it also encompasses a decrease in allowable non-residential uses. In addition, the goals/policies from the 2011 General Plan referenced above and continued collection of DIR Fees would reduce impacts from the proposed Project to a less than significant level. No service shortfall requiring additional personnel or equipment is anticipated as a result of the implementation of the proposed Project. No mitigation measures beyond the goals and policies identified in the General Plan 2035 are required. Therefore, no new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the 2011 Certified EIR. Thus, the proposed Project is consistent with the impacts identified in the 2011 Certified EIR and the level of impact (less than significant) remains unchanged from that cited in the 2011 Certified EIR.

Mitigation Measures Identified in the Certified EIR and Applicable to the Project

Not applicable.

SCHOOL FACILITIES

Section 5.19, School Facilities, of the 2011 Certified EIR included an analysis of school facilities within the City of Murrieta and evaluated potential impacts to such services that could result from implementation of the 2011 General Plan. The City of Murrieta is served by four public school districts. The primary school district is the Murrieta Valley Unified School District, with the exception of residents in the areas east of I-215 and north of Clinton Keith Road. The Menifee Union School District, Perris Union High School District, and Hemet Unified School District also provide school services and facilities to students in these areas.

The 2011 Certified EIR determined that based on future plans for school facilities in the MVUSD, MUSD, PUSD, HUSD, prior approved bonds, and collection of development impact fees on a case-by-case basis (Mitigation Measure SCH-1), school facility impacts would be reduced to a less than significant level. No goals or policies in the 2011 General Plan pertain specifically to school facilities.

No Changes or New Information Requiring Revision

The proposed Project does not change the potential impacts or mitigation measures discussed in the 2011 Certified EIR. The proposed Project would allow for an increase in residential uses which could increase the need for school facilities. However, based on future plans for school facilities in the MVUSD, MUSD, PUSD, HUSD, prior approved bonds, and collection of development impact fees on a case-by-case basis (Mitigation

Measure SCH-1) discussed in the 2011 Certified EIR, school facility impacts would be reduced to a less than significant level. No mitigation measures beyond those in the 2011 Certified EIR are required. Therefore, no new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the 2011 Certified EIR and the level of impact (less than significant) remains unchanged from that cited in the 2011 Certified EIR.

Mitigation Measures Identified in the Certified EIR and Applicable to the Project

SCH-1 Prior to the issuance of certificate of occupancy, individual project applicants shall submit evidence to the City of Murrieta that legally required school impact mitigation fees have been paid per the mitigation established by the applicable school district.

5.11 Recreational Facilities

Section 5.20 of the 2011 Certified EIR identified existing parks and recreational facilities within the City of Murrieta and Sphere of Influence, and evaluated potential impacts to such resources that could result from the implementation of the 2011 General Plan. As of June 2009, the Community Services Department was responsible for approximately 1,350 acres of open space, streetscape, slope, trails, and parkland. This included 48 parks and recreation facilities on 467.24 acres.

The 2011 Certified EIR determined that future development pursuant to the 2011 General Plan could result in significant and unavoidable impacts to parks and recreational facilities. Per the City's adopted standard of 5 acres of parkland per 1,000 residents, the 2011 Certified EIR identified an existing deficit of 34 acres of parkland. Future development pursuant to the 2011 General Plan would introduce approximately 3,346 new dwelling units, along with buildout of existing undeveloped residential areas for a total of 10,734 dwelling units throughout the City, resulting in an approximate population increase of 32,199 persons citywide. It was concluded that this increase in population would create new demand on current recreational infrastructure including parks, facilities, and programs and increase the parkland deficit.

Future development pursuant to the 2011 General Plan would be reviewed on an individual basis to determine their potential impact on parks and recreational facilities within the City. In addition, implementation of 2011 General Plan goals and policies (Goals ROS-1, ROS-2, ROS-3, ROS-4, ROS-5, ROS-6, ROS-7, ROS-8, CIR-8; Policies ROS-1.1, ROS-1.2, ROS-1.3, ROS-1.4, ROS-2.1, ROS-2.2, ROS-2.3, ROS-3.1, ROS-3.2, ROS-3.3, ROS-3.4, ROS-3.5, ROS-3.6, ROS-3.7, ROS-4.1, ROS-4.2, ROS-4.3, ROS-4.4, ROS-5.1, ROS-5.2, ROS-5.3, ROS-5.4, ROS-6.1, ROS-6.2, ROS-6.3, ROS-6.4, ROS-6.5, ROS-7.1, ROS-7.2, ROS-7.3, ROS-7.4, ROS-8.1, ROS-8.2, ROS-8.3, ROS-8.4, ROS-9.1, ROS-9.2, ROS-9.3, ROS-9.4, ROS-9.5, CIR-8.11, CIR-8.12) would ensure the provision for new developments to mitigate impacts to parkland and

recreational facilities. Payment of park facilities fees and/or dedication of parkland by future developments would further reduce potential park impacts. However, with the City's existing parkland deficiency and future growth associated with the 2011 General Plan, impacts were determined to be significant and unavoidable.

No Changes or New Information Requiring Revision

The proposed Project does not change the potential impacts or mitigation measures discussed in the 2011 Certified EIR. Future development pursuant to the proposed Project may result in the development of the same vacant and underutilized land analyzed in the 2011 Certified EIR. Further, while the proposed Project reduces non-residential square footage by 2,405,601 square feet, it allows for an additional 1,572 dwelling units. This increase in residential density would increase the demand for residential resources, including parkland and recreational facilities, and would further increase the parkland deficiency. As in the 2011 Certified EIR, future development pursuant to the proposed Project would continue to be reviewed for potential impacts on parks and recreational facilities and would further be required to comply with applicable federal, state, and local regulations, relevant General Plan goals and policies, and mitigation measures. However, because of the existing parkland deficiency and future growth associated with the proposed Project, the proposed Project would still result in potential significant unavoidable impacts to parks and recreational facilities. Therefore, no new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the 2011 Certified EIR. Thus, the proposed Project is consistent with the impacts identified in the 2011 Certified EIR and the level of impact (significant unavoidable) remains unchanged from that cited in the 2011 Certified EIR.

Mitigation Measures Identified in the Certified EIR and Applicable to the Project

Not applicable.

5.12 Tribal Cultural Resources

Since the certification of the 2011 Certified EIR, a CEQA Guidelines update and approval by the Governor of Assembly Bill 52 (Chapter 532, Statutes 2014) have provided additional analysis and requirements related to tribal cultural resources. On July 1, 2015, tribal cultural resources were added as a separate environmental topic to Appendix G of the CEQA Guidelines with two checklist questions. Assembly Bill 52 ([AB 52] Gatto, 2014) requires lead agencies to begin consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of a proposed project, if they have requested to be notified of projects subject to AB 52 and responds, in writing, within 30 days of receipt of the formal notification, and requests the consultation.

Section 5.9, Cultural Resources, of the 2011 Certified EIR included an analysis of cultural (and tribal cultural) resources within the City of Murrieta and Sphere of Influence, and evaluated potential impacts to such resources that could result from implementation of the 2011 General Plan. Cultural resources are represented by the material remnants of human activity in an area and can be either prehistorical (aboriginal/native American) or historical (European and Euro-American). Within the City and the Sphere of Influence, 199 cultural (and tribal cultural) resources have been documented. The significance of each of these resources was not identified, and instead requires consideration on a site- or resource-specific basis.

The 2011 Certified EIR determined that future development pursuant to the 2011 General Plan could result in potentially significant impacts to cultural and tribal cultural resources through the development of vacant and underutilized land, which could unearth previously unknown cultural or tribal cultural resources. Thus, future development would be subject to compliance with General Plan 2035 Conservation Element and Land Use Element goals and policies (Goals CSV-9, CSV-11, LU-11, LU-22, LU-24; Policies CSV-9.1, CSV 11.1 – 11.9, LU 11.1, LU 11.7, LU 22.3 – 22.4, LU 24.1) and Mitigation Measures CR-1 through CR-3, ensuring that future development in the City would not adversely impact cultural or tribal cultural resources, thereby concluding less than significant impacts.

Additionally, the 2011 Certified EIR determined that ground-disturbing activities in the City, such as grading or excavation associated with future development, have the potential to disturb as yet unidentified human remains. However, following compliance with State regulations, which detail the appropriate actions necessary in the event human remains are encountered, and compliance with General Plan 2035 Conservation Element goals and policies (Goal CSV-11; Policy CSV-11.5) and Mitigation Measures CR-2 and CR-3, impacts were concluded to be less than significant.

No Changes or New Information Requiring Revision

The proposed Project does not change the potential impacts or mitigation measures discussed in the 2011 Certified EIR. Future development pursuant to the proposed Project may result in the development of the same vacant and underutilized land analyzed in the 2011 Certified EIR. Likewise, the impacts of future development projects would be evaluated on a case by case basis. And future development would be required to comply with applicable federal, state, and local regulations, relevant General Plan goals and policies, and mitigation measures. Therefore, no new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the 2011 Certified EIR. Thus, the proposed Project is consistent with the impacts identified in the 2011 Certified EIR and the level of impact (less than significant) remains unchanged from that cited in the 2011 Certified EIR.

Mitigation Measures Identified in the Certified EIR and Applicable to the Project

CR-1 Future development projects shall continue to be evaluated for cultural resources by the City of Murrieta through review by the Eastern Information Center (EIC) and notification of and consultation with the local tribes for new entitlement projects. The projects shall be evaluated for compliance with the California Environmental Quality Act (CEQA) and where feasible, avoidance of cultural resources. If, following review by the EIC and/or tribal consultation, it is determined that there is a potential for impacts to cultural resources, further cultural resources analysis by a qualified professional(s), as defined in Mitigation Measure CR-2, may be required by the City.

CR-2 In the event that cultural resources (archaeological, historical, paleontological) resources are inadvertently unearthed during excavation and grading activities of any future development project, the contractor shall cease all earth-disturbing activities within a 100-foot radius of the area of discovery. If not already retained due to conditions present pursuant to Mitigation Measure CR-1, the project proponent shall retain a qualified professional (i.e., archaeologist, historian, architect, paleontologist, Native American Tribal monitor), subject to approval by the City of Murrieta to evaluate the significance of the find and appropriate course of action (refer to Mitigation Measures CR-1 and CR-3). If avoidance of the resources is not feasible, salvage operation requirements pursuant to Section 15064.5 of the CEQA Guidelines shall be followed. After the find has been appropriately avoided or mitigated, work in the area may resume.

CR-3 In the event that human remains are unearthed during excavation and grading activities of any future development project, all activity shall cease immediately. Pursuant to State Health and Safety Code Section 7050.5, no further disturbance shall occur until the County coroner has made the necessary findings as to origin and disposition pursuant to Public Resources Code Section 5097.98. If the remains are determined to be of Native American descent, the coroner shall within 24 hours notify the Native American Heritage Commission (NAHC). The NAHC shall then contact the most likely descendant of the deceased Native American, who shall serve as consultant on how to proceed with the remains.

5.13 Water Supply

Section 5.15 of the 2011 Certified EIR evaluated impacts to water supplies and distribution systems that could result from the implementation of 2011 General Plan. Impacts include an increase in the City's population and businesses, and thus, an overall increase in total water demand. In addition, portions of the City include "key hole" areas that are not located within a water district and operate on individual well systems. The City relies on water connection services provided by four water districts: Rancho California Water District (RCWD), Elsinore Valley Municipal Water District (EVMWD), Western Municipal Water District (WMWD), and Eastern Municipal Water District (EMWD). The Urban Water Management Plans (UWMP) for all four water

districts provide a long-range (25-year) assessment of water supply and recommended operational improvements for each service area, which includes the City of Murrieta.

The 2011 Certified EIR determined that the four water districts would have adequate water supplies based on normal, dry and multiple dry years and water shortage contingency plans to meet the future regional water needs, including the growth anticipated with the 2011 General Plan, through 2030. Future development would be reviewed by the City on a project-by-project basis to ensure adequate water supplies are available to accommodate future projects. In addition, it is anticipated that future development within "key hole" areas would annex to the appropriate water district for service and connection to the infrastructure systems. New development would be required to pay its share of the costs of infrastructure improvements necessary to accommodate the proposed Project. The 2011 General Plan includes policies (CSV 1.1 – 1.6, CSV 2.1 – 2.5, CSV 9.1 – 9.6, 9.8, 9.9; CSV 15.5 – 15.6; INF 1.1 – INF 1.10, NF 1.21 – 1.24) to ensure that a reliable water supply can be provided within the City's service area. The 2011 General Plan policies promote conservation, protection, and management of water resources to meet long-term community needs and compliance with requirements from the State and appropriate agencies regarding comprehensive water conservation measures to ensure sufficient water supplies for human consumption, sanitation, and fire protection. With adherence to the 2011 General Plan policies and the City of Murrieta *Municipal Code Water Efficient Landscape Ordinance*, compliance with the applicable UWMPs, coordination between the City and water districts and that Murrieta would only use 2.36 percent of the anticipated water from these four water districts, water supply and infrastructure impacts associated with the 2011 General Plan would be reduced to a less than significant level.

No Changes or New Information Requiring Revision

The proposed Project does not change the potential impacts discussed in the 2011 Certified EIR. Although the proposed Project would allow for an increase in residential uses, it also encompasses a decrease in allowable non-residential uses. The Water Study for the Murrieta General Plan Update and Eastern Municipal Water District Potential Annex Area prepared by Jacobs (June 2019) concludes that the proposed decrease in water demands from the 2011 General Plan is approximately one percent, under the proposed Project. In addition, with adherence to the policies from the 2011 General Plan referenced above, the City of Murrieta Municipal Code Water Efficient Landscape Ordinance, compliance with the applicable UWMPs, coordination between the City and water districts, water supply and infrastructure impacts associated with the proposed Project remains unchanged (less than significant level) from that cited in the 2011 Certified EIR.

The proposed Project does not include any annexations into the EMWD; however, the Water Study for the Murrieta General Plan Update and Eastern Municipal Water District Potential Annex Area prepared also includes a facilities assessment of a particular "key hole" area located within the City as shown on Exhibit 3-3 and shown as "Potential

EMWD Annexation Area". The information pertaining to this "key hole" area is for informational purposes only as the Project does not include any annexations.

Mitigation Measures Identified in the Certified EIR and Applicable to the Project

Not applicable.

5.14 Wastewater

Section 5.16, Wastewater, of the 2011 Certified EIR identifies the nature and location of wastewater conveyance and treatment facilities and existing related infrastructure for the City of Murrieta; it provides an analysis of projected impacts to wastewater conveyance and treatment facilities, as well as the estimated demands that could result from the implementation of the 2011 General Plan. Wastewater collection for the City is provided by the same four water districts that deliver potable water to the City: RCWD, EVMWD, WMWD, and EMWD. Only RCWD and EMWD provide wastewater treatment.

The 2011 Certified EIR determined that implementation of the 2011 General Plan could potentially result in additional development, resulting in an increase in the City's population and businesses, and thus, an overall increased demand on the existing sewer system from increased sewage flows. In addition, portions of the North Murrieta Business Corridor, South Murrieta Business Corridor, and the Golden Triangle North Focus Areas, along with parcels in the "key hole" area, which includes the Los Alamos Hills are not located within a water district and operate on individual septic systems. It is anticipated that future development within these areas would annex to the appropriate water district for service and connection to the infrastructure systems. In addition, there are a number of locations within the City that have no or limited infrastructure in place which include, but are not limited to, areas designated as Rural Residential, as well as the Northern Murrieta Business Corridor, Clinton Keith/Mitchell, Golden Triangle North, South Murrieta Business Corridor, and Multiple Use Area 3 Focus Areas. Individual developments would be reviewed by the City of Murrieta and the applicable water district to determine if sufficient sewer capacity exists to serve the specific development. The applicable water district would charge fees for the privilege of connecting to their sewerage systems or increasing the strength and/or quantity of wastewater attributable to a particular parcel or operation already connected. The fees are required to construct new sewer infrastructure and/or incremental expansions to the existing sewerage system to accommodate individual development, which would mitigate the impact of the development on the sewerage system.

With continued growth expected to increase demand for wastewater treatment, both EMWD and RCWD plan to expand the capacity of the treatment facilities serving Murrieta. The water districts would only allow new developments to connect to their sewer systems if there is sufficient capacity or planned expansions of its facilities to accommodate new developments proposed. Therefore, new development would not be permitted to exceed the capacity of wastewater conveyance systems or treatment

facilities, since adequate capacity must be demonstrated in order to contribute flows to the system.

The 2011 Certified EIR determined that with the anticipated expansion of the EMWD and RCWD treatment facilities, City coordination with the water districts, implementation of the 2011 General Plan policies (INF – 1.1 - 1.10; INF – 1.21; CSV – 1.1 - CSV-1.4 and CSV-1.6), and mitigation measures (WW-1, WW-2, and WW-3) requiring individual development projects to verify sufficient wastewater transmission and treatment plant capacity is available to serve the proposed development, impacts would be reduced to a less than significant level. Furthermore, the 2011 General Plan would only use approximately 6.79 percent of the anticipated wastewater collection from EMWD and RCWD's Santa Rosa Water Reclamation Facility. Therefore, impacts are less than significant in this regard; however the 2011 Certified EIR includes Mitigation Measures that have been recommended for future development projects to ensure that impacts remain at less than significant levels.

No Changes or New Information Requiring Revision

The proposed Project does not change the potential impacts or mitigation measures discussed in the 2011 Certified EIR. While the proposed Project would allow for an increase in residential uses of 1,572 dwelling units, it also includes a reduction of 2,405,601 square feet of non-residential uses. With the anticipated expansion of the EMWD and RCWD treatment facilities, City coordination with the water districts, implementation of the existing General Plan goal and policies, and mitigation measures (WW-1, WW-2, and WW-3) from the 2011 Certified EIR requiring individual development projects to verify sufficient wastewater transmission and treatment plant capacity is available to serve the proposed development, impacts would remain less than significant. Therefore, no new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the 2011 Certified EIR. Thus, the proposed Project is consistent with the impacts identified in the 2011 Certified EIR and the level of impact (less than significant) remains unchanged from that cited in the 2011 Certified EIR.

Mitigation Measures Identified in the Certified EIR and Applicable to the Project

WW-1 Prior to issuance of a wastewater permit for any future development project, the Project Applicant shall pay applicable connection and/or user fees to RCWD, EVMWD, WMWD, or EMWD.

WW-2 Prior to issuance of a building permit for any future development project, the Project Applicant shall prepare an engineering study to support the adequacy of the sewer systems and submit the engineering study to the City for review and approval. Any improvements recommended in the engineering study shall be installed prior to the certificate of occupancy for the development project.

WW-3 Prior to issuance of a building permit for any future development project, the Project Applicant shall provide evidence that the RCWD, EVMWD, WMWD, or EMWD has sufficient wastewater transmission and treatment plant capacity to accept sewage flows from buildings for which building permits are being requested.

5.15 Solid Waste

Section 5.21, Solid Waste, of the 2011 Certified EIR identified the potential solid waste impacts associated with the implementation of the 2011 General Plan and compared the solid waste generation of the 2011 General Plan with the capacity of the existing landfills that accept solid waste from the City of Murrieta.

The 2011 Certified EIR determined that the majority of solid waste generated within the City is disposed of at El Sobrante Landfill. The El Sobrante Landfill has a daily permitted capacity of 16,054 tons/day. In 2009, the City disposed of approximately 50,215 tons of solid waste in this landfill (approximately 137.6 tons per day). This represents approximately 0.0086 percent of this landfill's permitted daily capacity. The 2011 Certified EIR states that implementation of the 2011 General Plan would generate an additional 348,541 lbs/day or 175 tons/day of solid waste, or 63,875 tons of solid waste per year which represents an approximate 0.0026 percent increase of the combined daily permitted capacity all landfills currently serving the City.

The 2011 Certified EIR determined that the City had a diversion rate of 49 percent in 2006 and in December 2008, the California Integrated Waste Management Board found Murrieta to be in compliance with state requirements, having made a "good faith" effort to meet the 50 percent reduction goal. Compliance with City and County waste reduction programs and policies would reduce the volume of solid waste entering landfills. Individual development projects within the City would be required to comply with applicable State and local regulations, thus reducing the amount of landfill waste by at least 50 percent. Nonetheless, buildout associated with implementation of the 2011 General Plan would increase the volume of solid waste generated in the City that is diverted to existing landfills, thus contributing to the acceleration of landfill closures or the use of more distant sites. However, the closure dates for the various landfills range from 2013 until 2067. Combined remaining capacities at the landfills would be adequate to accommodate the buildout of the 2011 General Plan 2035. The 2011 General Plan Conservation Element includes policies (CSV 13-1 – 13.7) address opportunities to reduce solid waste generation and disposal within the City. Additionally, future developments resulting from the implementation of the 2011 General Plan would be reviewed on a project-by-project basis to ensure that solid waste disposal services and landfill facilities would be available to serve the development. All development projects would be required to comply with Federal, State, and local statutes and regulations related to solid waste. Therefore, per the 2011 Certified EIR, implementation of 2011 General Plan would result in less than significant impacts.

No Changes or New Information Requiring Revision

The proposed Project does not change the potential impacts or mitigation measures discussed in the 2011 Certified EIR. While the proposed Project would allow for an increase in residential uses of 1,572 dwelling units, it also includes a reduction of 2,405,601 square feet of non-residential uses. In addition, combined remaining capacities at the landfills would be adequate to accommodate the buildout of the proposed Project. Conservation Element policies (CSV 13-1 – 13.7) address opportunities to reduce solid waste generation and disposal within the City. Additionally, future developments resulting from the implementation of the proposed Project would be reviewed on a project-by-project basis to ensure that solid waste disposal services and landfill facilities would be available to serve the development. All development projects would be required to comply with Federal, State, and local statutes and regulations related to solid waste. Thus, the proposed Project is consistent with the impacts identified in the 2011 Certified EIR and the level of impact (less than significant) remains unchanged from that cited in the 2011 Certified EIR.

5.16 Electricity and Natural Gas

Section 5.22 of the 2011 Certified EIR evaluated potential electricity and natural gas impacts associated with implementation of the 2011 General Plan. Electrical power is provided within the City of Murrieta by Southern California Edison (SCE). The City of Murrieta receives its natural gas service from Southern California Gas Company (SCG), a subsidiary of Sempra Energy.

The 2011 Certified EIR determined that implementation of the 2011 General Plan would result in an increased electricity demand and that SCE would be able to serve the projected buildout resulting from implementation of the 2011 General Plan. It is anticipated that service demands created by implementation of the 2011 General Plan are within the service parameters of SCE current and future transmission and service infrastructure. SCE would update existing facilities or add new facilities in the City as needed throughout the life of the 2011 General Plan. Financial responsibility for any updates or additional facilities would be in accordance with SCE's rules and tariffs. All new developments that require new electricity lines to be installed would be required to pay applicable fees assessed by SCE to extend electricity lines to serve a specific project site. SCE would not provide service to new developments if there were not adequate electricity supplies and infrastructure to maintain existing service levels and meet the anticipated electricity demands of the specific development requesting service. In addition, all new construction in the State of California is subject to the energy conservation standards set forth in *Title 24*, Parts 6 and 11 of the *California Code of Regulations*. These are prescriptive standards that establish maximum energy consumption levels for the heating and cooling of new buildings. Furthermore, the 2011 General Plan includes policies related to conservation and energy efficiency in the Infrastructure and Conservation Elements (INF 1.2, 1.5, 1.7; CSV 12.1). Adherence to these building practices would reduce the demand for electricity. Therefore, the 2011

Certified EIR determined that implementation of the 2011 General Plan would result in less than significant impacts.

The 2011 Certified EIR determined that implementation of the 2011 General Plan would result in an increased natural gas demand and that SCG would be able to serve the projected increase. Each project would be reviewed on a case-by-case basis, which means that natural gas sources and infrastructure to serve the project(s) would be planned for well in advance of project construction. Additionally, Infrastructure and Conservation Elements policies (INF 1.2, 1.5, 1.7; CSV 12.1) would also be applicable to all future development projects requiring natural gas. Therefore, the 2011 Certified EIR determined that implementation of the 2011 General Plan would result in less than significant impacts.

No Changes or New Information Requiring Revision

The proposed Project does not change the potential impacts discussed in the 2011 Certified EIR for electricity and natural gas. While the proposed Project would allow for an increase in residential uses of 1,572 dwelling units, it also includes a reduction of 2,405,601 square feet of non-residential uses. In addition, each project would be reviewed on a case-by-case basis, which means that electricity and natural gas sources and infrastructure to serve the project(s) would be planned for well in advance of project construction. Infrastructure and Conservation Elements policies referenced above would also be applicable to all future development projects requiring electricity and natural gas. Thus, the proposed Project is consistent with the impacts identified in the 2011 Certified EIR and the level of impact (less than significant) remains unchanged from that cited in the 2011 Certified EIR.

5.17 Hydrology, Drainage, and Water Quality

Section 5.13 of the 2011 Certified EIR evaluated the existing conditions related to hydrology, drainage, and water quality within the City of Murrieta and the potential for hydrologic and drainage impacts that could result from implementation of the 2011 General Plan.

Water Quality

The 2011 Certified EIR determined that the 2011 General Plan could contribute to water quality degradation from run-off and chemical releases at future construction sites. However, new development and significant reconstruction projects within the City would be required to comply with Title 15 of the City's Municipal Code, which contains regulations to meet Federal and State water quality requirements related to storm water runoff. Furthermore, the 2011 General Plan Infrastructure and Conservation Elements contain policies (INF-1.1, 1.2, 1.4, 1.6, 1.15, INF 1.18-1.19 and CSV 4.1-4.6) to reduce water quality impacts. The 2011 General Plan also requires the continued compliance with Federal, State, and regional governments and agencies to protect and improve the

quality of local and regional groundwater resources available to the City. New development projects would be required to meet Federal, State, and local water quality standards and implement mitigation (if necessary) to reduce impacts to less than significant. Compliance with the City's Municipal Code Title 15, Riverside County DAMP, City of Murrieta WQMP, Riverside County MS4 permit, goals, and policies of the 2011 General Plan 2035, and Mitigation Measures HYD-1 and HYD-2 would reduce water quality and waste discharge impacts to a less than significant level.

No Changes or New Information Requiring Revision

The proposed Project does not change the potential impacts or mitigation measures discussed in the 2011 Certified EIR. Future development pursuant to the proposed Project may result in development of the same land that was analyzed in the 2011 Certified EIR with the same potential impacts to water quality.

Although the proposed Project would allow for an increase in residential uses, it also encompasses a decrease in allowable non-residential uses. New development and significant reconstruction projects within the City would be required to comply with Title 15 of the City's Municipal Code, which contains regulations to meet Federal and State water quality requirements related to storm water runoff. Furthermore, the 2011 General Plan Infrastructure and Conservation Elements contain policies (INF-1.1, 1.2, 1.4, 1.6, 1.15, INF 1.18-1.19 and CSV 4.1-4.6) to reduce water quality impacts. The 2011 General Plan also requires the continued compliance with Federal, State, and regional governments and agencies to protect and improve the quality of local and regional groundwater resources available to the City. New development projects would be required to meet Federal, State, and local water quality standards and implement mitigation (if necessary) to reduce impacts to less than significant. Compliance with the City's Municipal Code Title 15, Riverside County DAMP, City of Murrieta WQMP, Riverside County MS4 permit, goals, and policies of the 2011 General Plan, and Mitigation Measures HYD-1 and HYD-2 would reduce water quality and waste discharge impacts to a less than significant level. Therefore, no new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the 2011 Certified EIR. Thus, the proposed Project is consistent with the impacts identified in the 2011 Certified EIR and the level of impact (less than significant) remains unchanged from that cited in the 2011 Certified EIR.

Mitigation Measures Identified in the 2011 Certified EIR and Applicable to the Project

HYD-1 Prior to issuance of any Grading or Building Permit, and as part of the future development's compliance with the NPDES requirements, a Notice of Intent shall be prepared and submitted to the San Diego RWQCB providing notification and intent to comply with the State of California General Construction Permit. Also, a Stormwater Pollution Prevention Plan (SWPPP) shall be reviewed and approved by the Director of Public Works and the City

Engineer for water quality construction activities on-site. A copy of the SWPPP shall be available and implemented at the construction site at all times. The SWPPP shall outline the source control and/or treatment control BMPs to avoid or mitigate runoff pollutants at the construction site to the "maximum extent practicable." All recommendations in the Plan shall be implemented during area preparation, grading, and construction. The project applicant shall comply with each of the recommendations detailed in the Study, and other such measure(s) as the City deems necessary to mitigate potential stormwater runoff impacts.

HYD-2 Prior to issuance of any Grading Permit, future development projects shall prepare, to the satisfaction of the Director of Public Works and the City Engineer, a Water Quality Management Plan or Stormwater Mitigation Plan, which includes Best Management Practices (BMPs), in accordance with the Riverside County DAMP and the Murrieta WQMP. All recommendations in the Plan shall be implemented during post construction/operation phase. The project applicant shall comply with each of the recommendations detailed in the Study, and other such measure(s) as the City deems necessary to mitigate potential water quality impacts.

Groundwater Depletion

The 2011 Certified EIR determined that the 2011 General Plan could contribute to the depletion of groundwater and the increased population from the buildout of the 2011 General Plan would result in an ultimate increase in the demand for water supplies. However, not all of water districts serving the City obtain 100 percent of their water from groundwater basins and multiple districts have recharge plans in place. Additionally, the 2011 General Plan Conservation Element includes policies (CVS- 1.1 – CVS-1.6) that identify the protection and conservation of its existing and future water resources. The 2011 Certified EIR determined that compliance with the goals and policies in the 2011 General Plan Conservation Element would ensure impacts are at less than significant levels.

No Changes or New Information Requiring Revision

The proposed Project does not change the potential impacts or mitigation measures discussed in the 2011 Certified EIR. Future development pursuant to the proposed Project may result in development of the same land that was analyzed in the 2011 Certified EIR with the same potential impacts to groundwater depletion. Although the proposed Project would allow for an increase in residential uses, it also encompasses a decrease in allowable non-residential uses. Compliance with policies in the 2011 General Plan Conservation Element (CVS- 1.1 – CVS-1.6) would ensure impacts are at less than significant levels. Therefore, no new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the 2011 Certified EIR. Thus, the proposed Project is consistent with the impacts

identified in the 2011 Certified EIR and the level of impact (less than significant) remains unchanged from that cited in the 2011 Certified EIR.

Mitigation Measures Identified in the 2011 Certified EIR and Applicable to the Project

Not applicable.

Drainage System Capacity

The 2011 Certified EIR determined that implementation of the 2011 General Plan could contribute to runoff, which may exceed the capacity of the existing drainage system. However, new development projects associated with implementation of the 2011 General Plan would be required to ensure project-specific and citywide drainage systems have adequate capacity to accommodate new development. The City's annual CIP, as well as goals and policies (INF-1.1, 1.2, 1.4, 1.6, 1.15, INF 1.18-1.19; CSV 1.1 – CVS-1.6, and CVS 4.1-4.6) ensure that project-related storm water mitigation techniques are employed and monitored, are included in the 2011 General Plan. Furthermore, implementation of the required mitigation measures would ensure new development projects are designed to result in less than significant impacts related to the drainage system capacity. Compliance with the City's *Municipal Code*, the policies included in the 2011 General Plan Conservation Element, and Mitigation Measures HYD-1 and HYD-2 (referenced above in Water Quality) would ensure drainage system capacity impacts are reduced to a less than significant level.

No Changes or New Information Requiring Revision

The proposed Project does not change the potential impacts or mitigation measures discussed in the 2011 Certified EIR. Future development pursuant to the proposed Project may result in development of the same land that was analyzed in the 2011 Certified EIR with the same potential impacts to runoff which may exceed the capacity of the existing drainage system. Although the proposed Project would allow for an increase in residential uses, it also encompasses a decrease in allowable non-residential uses. Compliance with the policies in the 2011 General Plan Conservation Element would ensure impacts are at less than significant levels. Therefore, no new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the 2011 Certified EIR. Thus, the proposed Project is consistent with the impacts identified in the 2011 Certified EIR and the level of impact (less than significant) remains unchanged from that cited in the 2011 Certified EIR.

Mitigation Measures Identified in the 2011 Certified EIR and Applicable to the Project

Not applicable.

Drainage Patterns

The 2011 Certified EIR determined that the 2011 General Plan does not propose altering any drainage patterns. All applicable standards would be applied to future development projects to ensure that they are not constructed in a way that would alter a stream or river, or result in substantial erosion or flooding. No mitigation measures beyond the policies identified in the 2011 General Plan are required. Therefore, less than significant impacts would occur in this regard.

No Changes or New Information Requiring Revision

The proposed Project does not change the potential impacts or mitigation measures discussed in the 2011 Certified EIR. Although the proposed Project would allow for an increase in residential uses, it also encompasses a decrease in allowable non-residential uses. Compliance with the policies in the 2011 General Plan would ensure impacts are at less than significant levels. Therefore, no new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the 2011 Certified EIR. Thus, the proposed Project is consistent with the impacts identified in the 2011 Certified EIR and the level of impact (less than significant) remains unchanged from that cited in the 2011 Certified EIR.

Mitigation Measures Identified in the 2011 Certified EIR and Applicable to the Project

Not applicable.

Flooding

The 2011 Certified EIR determined a total of 1,021.2 acres in the City of Murrieta are within the 100-year flood zone. However, development associated with implementation of the 2011 General Plan would be subject to the City's Municipal Code. Chapter 15.56.040, Methods of Reducing Flood Loss, establishes provisions to ensure damage from floods within the City is minimized. Chapter 15.16.070, General Provisions, and Chapter 15.56.120, Administration, establishes flood zones in accordance with FEMA, and administrative procedures regarding development within or around flood zones. Additionally, the 2011 General Plan Safety Element includes the following policies (SAF-3.1 – 3.6) to address flooding and flood hazards within the City. It is anticipated that with implementation of these policies and the City's Municipal Code, flood hazards within the City would be reduced to a less than significant level.

No Changes or New Information Requiring Revision

The proposed Project does not change the potential impacts or mitigation measures discussed in the 2011 Certified EIR. Future development pursuant to the proposed Project may result in development of the same land that was analyzed in the 2011

Certified EIR with the same potential impacts to groundwater depletion. Although the proposed Project would allow for an increase in residential uses, it also encompasses a decrease in allowable non-residential uses. However, development associated with implementation of the proposed Project would be subject to the City's Municipal Code. Chapter 15.56.040, Methods of Reducing Flood Loss, establishes provisions to ensure damage from floods within the City is minimized. Chapter 15.16.070, General Provisions, and Chapter 15.56.120, Administration, establishes flood zones in accordance with FEMA, and administrative procedures regarding development within or around flood zones. Additionally, the 2011 General Plan Safety Element includes the policies (SAF-3.1 – 3.6) to address flooding and flood hazards within the City. Therefore, no new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the 2011 Certified EIR. Thus, the proposed Project is consistent with the impacts identified in the 2011 Certified EIR and the level of impact (less than significant) remains unchanged from that cited in the 2011 Certified EIR.

Mitigation Measures Identified in the 2011 Certified EIR and Applicable to the Project

Not applicable.

Dam Inundation

The 2011 Certified EIR determined that the 2011 General Plan the City of Murrieta is subject to potential flooding in the event of dam failure. Portions of the City of Murrieta are subject to potential dam inundation zones associated with Lake Skinner and Diamond Valley Lake. However, Dam failure is considered an extremely remote possibility. In addition, development associated with implementation of the 2011 General Plan would be subject to the provisions of Chapter 15 of the City's Municipal Code, which provides development provisions to reduce flooding. The 2011 General Plan Safety Element includes policies (SAF-4.1 – 4.3) that would minimize the potential for flooding to impact property and human life. Thus, less than significant impacts are anticipated in this regard. Furthermore, flooding risk for Murrieta is addressed in the City's Emergency Management Plan. Compliance with the City's Municipal Code, the policies included in the 2011 General Plan Safety Element, and the City's Emergency Management Plan would result in flood impacts being reduced to a less than significant level.

No Changes or New Information Requiring Revision

The proposed Project does not change the potential impacts or mitigation measures discussed in the 2011 Certified EIR. Future development pursuant to the proposed Project may result in development of the same land that was analyzed in the 2011 Certified EIR with the same potential impacts to dam inundation.

Although the proposed Project would allow for an increase in residential uses, it also encompasses a decrease in allowable non-residential uses. Compliance with the policies in the 2011 General Plan Safety Element would ensure impacts are at less than significant levels. Therefore, no new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the 2011 Certified EIR. Thus, the proposed Project is consistent with the impacts identified in the 2011 Certified EIR and the level of impact (less than significant) remains unchanged from that cited in the 2011 Certified EIR.

Mitigation Measures Identified in the 2011 Certified EIR and Applicable to the Project

Not applicable.

Inundation by Seiche, Tsunami or Mudflow

The 2011 Certified EIR determined that the possibility of seiches and tsunamis impacting the City is considered remote due to the great distance to large bodies of water. The nearest large body of water is Lake Elsinore, located approximately 6¼ miles northwest. Therefore, no impacts are anticipated to occur in this regard.

The 2011 Certified EIR determined that there is the potential for mudflow to occur with flood events. All future construction associated with the implementation of the 2011 General Plan would meet all applicable Federal, State, and local building, seismic, water quality, flood, and drainage standards, as previously discussed above. Additionally, 2011 General Plan Safety Element includes policies to address flooding and flood hazards within the City. It is anticipated that with implementation of these policies and the City's *Municipal Code*, mudflow hazards within the City would be reduced to a less than significant level.

No Changes or New Information Requiring Revision

The proposed Project does not change the potential impacts or mitigation measures discussed in the 2011 Certified EIR. Future development pursuant to the proposed Project may result in development of the same land that was analyzed in the 2011 Certified EIR with the same potential impacts to mudflow.

Anticipated to occur in regard to seiches and tsunamis remains unchanged (no impact). All future construction associated with the implementation of the proposed Project would meet all applicable Federal, State, and local building, seismic, water quality, flood, and drainage standards, as previously discussed above. Additionally, the 2011 General Plan Safety Element includes policies to address flooding and flood hazards within the City. It is anticipated that with implementation of these policies and the City's Municipal Code, mudflow hazards within the City would remains unchanged (less than significant). Therefore, no new or substantially greater impacts would occur with implementation of the proposed Project when compared to those identified in the 2011 Certified EIR.

Mitigation Measures Identified in the 2011 Certified EIR and Applicable to the Project

Not applicable.

5.18 Energy

According to the newly approved update to Appendix G of the CEQA Guidelines (December 2018), a project would have a significant effect on the environment if the project would: 1) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation. 2) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

Section 7.4, Energy Conservation, of the 2011 Certified EIR evaluated the wasteful, inefficient, and unnecessary consumption of energy caused by the implementation of the 2011 General Plan.

The 2011 Certified EIR determined that the 2011 General Plan could facilitate development of various commercial, office and research park, business park, industrial, and civic/institutional uses but that there are no unusual characteristics of the 2011 General Plan that would necessitate the use of construction equipment that is less energy-efficient than at comparable construction sites. Additionally, fuel consumption associated with vehicle trips generated by future development within Murrieta would not be considered inefficient, wasteful, or unnecessary in comparison to other cities in the region. In addition, the 2011 General Plan includes policies (CSV-12.1 – CSV-12.8, CSV-14.1 to CSV-14.4) to prioritize energy conservation, green building and the generation of energy from renewable sources, as part of an overall strategy to reduce greenhouse gas emissions.

No Changes or New Information Requiring Revision

The proposed Project does not change the conclusions discussed in the 2011 Certified EIR related to energy conservation. Future development pursuant to the proposed Project may result in the development of the same land analyzed in the 2011 Certified EIR. Likewise, future development would be required to comply with applicable federal, state, and local regulations, relevant General Plan goals and policies, and mitigation measures. The proposed Project's land use plan also incorporates a reorganized mix of land uses which will help to reduce vehicle miles travelled. Additionally, the proposed General Plan incorporates additional policies (CSV-2.6, CSV-2.7, CSV-9.10, CSV-12.9, CSV-12.10, CSV-12.11) that help to further prioritize energy conservation, green building and the generation of energy from renewable sources. And, the project's update to the Climate Action Plan supports the states goals for energy efficiency as well. Therefore, no new or substantially greater impacts would occur with

implementation of the Project when compared to the conclusions identified in the 2011 Certified EIR, resulting in a less than significant impact.

Mitigation Measures Identified in the Certified EIR and Applicable to the Project

Not Applicable.

6.0 Alternatives

6.1 Introduction

CEQA Guidelines Section 15126.6(a) requires the proposed Project identify and evaluate a range of reasonable alternatives to the proposed Project, which would feasibly achieve the basic objectives of the proposed Project, but would avoid or substantially lessen any of the significant effects of the Project. *CEQA* also requires that a comparative evaluation be done that evaluates the merits of each of the alternatives.

Pursuant to *CEQA Guidelines* Section 15126.6 (f)(1), factors that may be taken into account when addressing the feasibility of alternatives include, but are not limited to, site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, and jurisdictional boundaries. There is no limit on the number of Alternatives that can be presented, however, these factors help to establish and determine the appropriate number of alternatives necessary to ensure public participation and informed decision-making is accomplished throughout the process.

2019 FOCUSED GENERAL PLAN UPDATE PROCESS

In 2009, the City of Murrieta initiated a comprehensive update of the General Plan which was adopted on July 19, 2011 and included a Climate Action Plan. In 2018, the City issued a request for proposals (RFP) to prepare a focused General Plan Update (GPU) of the City's 2011 General Plan, a CAP Update, and the preparation of the SEIR. In 2019, the City augmented the scope of work to include a Zoning Code Update. The "proposed Project" in this SEIR includes a GPU, CAP Update, and Zone Code Amendment. The City of Murrieta's objectives for the proposed Project are as discussed in Section 3.0, Project Description.

Determination of Alternatives to Be Analyzed

The Alternatives discussed in this Section were established by community values, outreach and working with City staff which lead to the creation of an environmental superior alternative and two additional alternatives.

ALTERNATIVES ANALYSIS

Potentially significant impacts that would result from implementation of the proposed Project are identified in Section 4.0, New Environmental Analysis. This section considers and compares alternatives to the proposed Project that could either avoid or minimize these impacts. A description of each alternative is provided below, as well as a comparison of the environmental impacts of each alternative in relation to the impacts identified for the proposed Project.

6.2 No Project Alternative

6.2.1 Description

As required by *CEQA Guidelines* Section 15126.6 (e), the No Project Alternative describes buildout of the City of Murrieta in accordance with existing zoning and General Plan land use designations and policies of the current General Plan, General Plan 2035, which was adopted in 2011 (refer to *Exhibit 3 -2*, *Existing General Plan 2035 Land Use Policy Map*). This Alternative assumes that ultimate buildout of the existing Project would occur. The No Project Alternative encompasses the same geographic area as that in the proposed Project.

6.2.2 Impact Evaluation

AESTHETICS

Future development is likely to result on the same land in both the No Project Alternative and the proposed Project. The potential future development will result in both short-term and long-term changes to the existing visual character of those areas. However, in both cases, appropriate goals, policies and mitigation measures from the adopted General Plan would be followed to ensure that the impact is less than significant. Both the No Project Alternative and the proposed Project would encourage preservation of existing residential neighborhoods within the City. Therefore, the No Project Alternative is considered neither environmentally superior nor inferior to the proposed Project in this regard.

AGRICULTURAL RESOURCES

Both the No Project Alternative and the proposed Project may involve the development of land currently used for agricultural purposes. Therefore, the potential impacts to

agricultural land would be similar in both cases; no new or greater impacts are anticipated with the proposed Project. Any future development under either plan would comply with any relevant goals, policies and mitigation measures of the General Plan and with any applicable federal, state, and local regulations. Therefore, the No Project Alternative is considered neither environmentally superior nor inferior to the proposed Project in this regard.

AIR QUALITY

Both the No Project Alternative and the proposed Project would result in significant unavoidable impacts related to air quality. In both cases, there would be short-term impacts related to construction emissions, and long-term impacts related to operational emissions. There would also be an increase in vehicles to and from the potential future developments, which would contribute to a decrease in air quality in and around the development areas due to vehicle emissions. However, the proposed Project aims to provide a better jobs/housing balance than currently exists in the No Project Alternative which would likely reduce vehicle miles travelled (VMT). In this regard, the No Project Alternative is considered environmentally inferior to the proposed Project.

BIOLOGICAL RESOURCES

The No Project Alternative would result in similar land disturbance and increased human activity during future development as the proposed Project. Therefore, it is anticipated that the impacts to biological resources, would be the similar in both cases. Both the No Project Alternative and the proposed Project include goals, policies and mitigation measures to lessen the impacts of the disturbance. Therefore, the No Project Alternative is considered neither environmentally superior nor inferior to the proposed Project in this regard.

CULTURAL RESOURCES

Both the No Project Alternative and the proposed Project would allow for development on existing vacant land throughout the City. Therefore, potential impacts to known or unknown/undiscovered historical, archaeological, or paleontological resources would be similar or the same under the No Project Alternative or the proposed Project. Additionally, both the No Project Alternative and the proposed Project propose goals, policies and mitigation measures protect and preserve significant cultural resources and comply with applicable state and federal laws if cultural resources are unearthed during any future development. Therefore, the No Project Alternative is considered neither environmentally superior nor inferior to the proposed Project in this regard.

ENERGY

Since the adoption of the 2011 certified EIR, Appendix G of the CEGA Guidelines has been revised to include significant threshold criteria for energy conservation. The certified 2011 EIR analyzed energy conservation but not to the extent that the proposed Project does, based on the new significance thresholds. The proposed Project's land use plan includes a reorganized mix of land uses which will help to reduce vehicle miles travelled. Additionally, the proposed Project incorporates additional policies to further prioritize energy conservation, green building and renewable energy. Therefore, the No Project Alternative is considered environmentally inferior to the proposed Project in this regard.

GEOLOGY AND SEISMIC HAZARDS

Future development is likely to result on the same land in both the No Project Alternative and the proposed Project. In both cases, potential new development would expose people and structures to potential geologic and seismic hazards. However, the level of impact would be considered less than significant as new development under both the No Project Alternative and the proposed Project would adhere to and comply with applicable building codes and standards relating to geology and seismicity. The No Project Alternative would involve less residential units and more non-residential square footage than the proposed Project; however mitigation would remain similar in both cases. Therefore, the No Project Alternative is considered neither environmentally superior nor inferior to the proposed Project in this regard.

GREENHOUSE GAS EMISSIONS

Both the No Project Alternative and the proposed Project would result in additional GHG emissions with future development. In 2011, the City prepared a Climate Action Plan (CAP) to address GHG emissions reduction within the City. The 2011 CAP includes a variety of strategies, measures, and actions to reduce GHG emissions in accordance with State reduction goals. In accordance with AB 32, the City would be required to reduce GHG emissions to 1990 levels by 2020, 40% below 1990 levels by 2030 and 80% below 1990 levels by 2050. As shown in Table 9 of the Draft Tech Memo: Air Quality and Greenhouse Gas Impact Analysis (Appendix C), after implementation of State, federal, and local actions, the forecasted years for both the No Project Alternative and the proposed Project still do not meet the goals to reduce impacts on climate change. Without further action from the City, GHG emission reduction targets for the City would not be met. Although, both the No Project Alternative and the proposed Project do not meet these goals, the forecasts for the proposed Project result in less GHG emissions than the No Project Alternative. Therefore, the No Project Alternative is considered environmentally inferior to the proposed Project in this regard.

HAZARDS AND HAZARDOUS MATERIALS

Both the No Project Alternative and the proposed Project include non-residential land uses throughout the City of Murrieta. These non-residential uses may involve the storage and/or use of hazardous materials. The No Project Alternative and the proposed Project both provide goals, policies and mitigation measures to ensure that the impacts are less than significant. However, the No Project Alternative would result in more non-residential uses than the proposed Project. Non-residential uses are more likely to involve the storage and use of hazardous materials. Hazardous substance incidents and materials are often associated with transportation and certain businesses such as agricultural businesses. Therefore, the No Project Alternative is considered environmentally inferior to the proposed Project in this regard.

HYDROLOGY, DRAINAGE, AND WATER QUALITY

The No Project Alternative and the proposed Project will likely result in development of the same land. Although the proposed Project would allow for an increase in residential uses, it would also include a reduction of non-residential uses. Both the No Project Alternative and the proposed Project include goals, policies and mitigation measures to ensure impacts are less than significant. Additionally, all new development would need to comply with Federal, State, and Regional governments and agencies to protect and improve the quality of local and regional groundwater resources to reduce the impacts of water quality and waste discharge. New development resulting from the either the No Project Alternative or the proposed Project would be reviewed on a project-by-project basis to ensure that hydrology, drainage and water quality standards were upheld. Therefore, the hydrology, drainage, or water quality impacts from potential future development would be similar in both cases. Accordingly, the No Project Alternative is considered neither environmentally superior nor inferior to the proposed Project in this regard.

LAND USE

An objective of the proposed Project is to modify the organization and location of land use designations in key areas within the City of Murrieta to reflect the vision of the City and respond to the projected development patterns to the year 2035. The No Project Alternative land use designations no longer adequately address the development patterns or the land use vision for the City. There are two key differences between the No Project Alternative Land Use Policy Map and the proposed Project Land Use Policy Map. Firstly, the proposed Project identifies six (6) key areas where the change of land use is necessary to accommodate future development patterns and projections. The proposed Project anticipates an increase in dwelling units by 1,572 and a decrease in non-residential uses by 2,405,601 square feet from what was estimated in the No Project Alternative. Secondly, the proposed Project revises and updates the existing

Land Use Element, including establishing a new land use designation, Innovation, which responds to changes in development patterns over time and allows greater flexibility and variety in the types of non-residential development. The changes to the Land Use Element in the proposed Project helps to create a better jobs/housing ratio in response to development patterns in the City, compared to the No Project Alternative, while still achieving the City's goals in terms of economic development. Therefore, the No Project Alternative is considered environmentally inferior to the proposed Project in this regard.

MINERAL RESOURCES

Future development under both the No Project Alternative and the proposed Project would likely be on the same land. Therefore, the potential impacts to mineral resources would be similar in both cases as no new resources have been identified. In both cases, future development would be required to comply with any applicable federal, state or local laws or regulations regarding mineral resources and therefore impacts would be less than significant. Therefore the No Project Alternative is considered neither environmentally superior nor inferior to the proposed Project in this regard.

NOISE

The No Project Alternative would result in less residential development and more non-residential development than the proposed Project. In both cases, there would be unavoidable short-term and long-term noise impacts related to construction noise, operational noise and traffic associated noise impacts with the development regardless of the type of land use. These noise impacts would be reduced through adherence to the goals, policies and mitigation measures in the proposed Project. Therefore, the No Project Alternative is considered environmentally neither superior nor inferior to the proposed Project in this regard.

POPULATION, HOUSING, AND EMPLOYMENT

The No Project Alternative no longer responds to the current population and development projections to the year 2035. Both the No Project Alternative and the proposed Project provide non-residential uses that respond to and reflect the City of Murrieta's goals and priorities in terms of economic development and employment opportunities. However, the proposed Project allows for more residential development than the No Project Alternative and in turn creates a more desirable jobs/housing balance, while still achieving the City's economic goals. Therefore, the No Project Alternative is considered environmentally inferior to the proposed Project in this regard.

PUBLIC SERVICES AND UTILITIES

Both the No Project Alternative and the proposed Project would allow for development of land for both residential and non-residential land uses, which would result in an increased demand on public services and utilities. Both the No Project Alternative and the proposed Project provide goals, policies and mitigation measures to ensure that impacts are less than significant; however there are still some significant impacts in terms of parks and recreational facilities that are unavoidable. The No Project Alternative would allow for less residential units and more non-residential square footage than the proposed Project. The proposed Project allows for an additional 1,572 dwelling units and the increase in residential units would likely increase demand for public services; in particular, park resources, recreational facilities and school facilities. Therefore, the level of service and demand for service would likely be less with the No Project Alternative than the proposed Project. Therefore, the No Project Alternative is considered environmentally superior to the proposed Project in this regard.

TRAFFIC AND CIRCULATION

Although the No Project Alternative provides goals and policies to support and encourage alternative modes of transportation, it does not do so to the extent of the proposed Project. Additionally, the proposed Project aims to create a better jobs/housing ratio which would assist in decreasing traffic congestion and lowering VMT. Therefore, since the number of deficient intersections would be less with the proposed Project, fewer impacts would occur under the proposed Project when compared to the No Project Alternative. Therefore, the No Project Alternative is considered environmentally inferior to the proposed Project.

TRIBAL CULTURAL RESOURCES

Future development resulting from the implementation of both the No Project Alternative and the proposed Project may result on the same land and have the potential to impact or affect cultural resources. These potential development projects would need to be evaluated on a case-by-case basis. In both cases, any future development would be required to comply with applicable federal, state, and local regulations, as well as any relevant General Plan goals, policies, and mitigation measures. Therefore, the No Project Alternative is considered neither environmentally superior nor inferior to the proposed Project in this regard.

WILDFIRE

Development resulting from the implementation of either the No Project Alternative or the proposed Project would result on the same land and could be exposed to wildfire risks. Since the adoption of the 2011 certified EIR, Appendix G of the CEQA Guidelines has been revised to include significance threshold criteria for wildfire threat. The certified 2011 EIR analyzed fire protection but not to the extent that the proposed

Project does, based on the new significance thresholds. The proposed Project provides policies that address wildfire risks and encourages continued consideration of the impacts to wildfire services. Therefore, the No Project Alternative is considered environmentally inferior to the proposed Project in this regard.

CONCLUSION

The No Project Alternative would result in similar environmental impacts as the proposed Project for aesthetics, agricultural resources, biological resources, cultural resources, geology and seismic hazard, hydrology, drainage and water quality, mineral resources, noise, and tribal cultural resources. However, the No Project Alternative may generate higher impacts than the proposed Project with respect to air quality, energy, greenhouse gas emissions, hazards and hazardous materials, land use, population, housing and employment, traffic and circulation, and wildfire. The No Project Alternative would generate fewer impacts than the proposed Project with respect to public services and utilities. The goal of the proposed Project is to provide updated information on conditions in the City, as well as respond to the goals and visions of the City. Although the No Project Alternative would result in many similar environmental impacts as the proposed Project, it does not address development patterns, future projections or provide updated land use plans to the extent that the proposed Project does. Based on the environmental impacts above and comparison with the proposed Project, the No Project Alternative would not serve the City of Murrieta as effectively as the proposed Project. Therefore, the No Project Alternative is considered environmentally inferior to the proposed Project.

6.3 Alternative 2

6.3.1 Description

Alternative 2 assumes that the proposed Project, including all goals and policies would be adopted; however, the land use designations in Area 4, identified on the General Plan 2035 Land Use Policy Map, Alternative 2 (*refer to Exhibit 6-1*) would provide for greater residential dwelling units and less non-residential square footage when compared to the proposed Project (refer to *Exhibit 3-3, General Plan 2035 Land Use Policy Map* in Section 3.0 Project Description*)*. As such, citywide growth would be the same for both the Alternative 2 and the proposed Project outside of Area 4.

When compared to the proposed Project, Alternative 2 includes the same mix of land use designations but in different quantities and location within Area 4 and would result in approximately 57.2 more acres of residential uses and approximately 57.2 fewer acres non-residential uses.

6.3.2 Impact Evaluation

AESTHETICS

Alternative 2 would allow for more multi-family residential units in Area 4, compared to the proposed Project. In both cases, potential future development of this area would result in both short-term and long-term changes to the existing visual character of the area. However, appropriate goals, policies and mitigation measures from the adopted General Plan would be followed to ensure that the impact is less than significant. Both Alternative 2 and the proposed Project would encourage preservation of existing residential neighborhoods within the City. Therefore, Alternative 2 is considered neither environmentally superior nor inferior to the proposed GPU in this regard.

AGRICULTURAL RESOURCES

Both Alternative 2 and the proposed Project may involve the development of land currently used for agricultural purposes. Therefore, the potential impacts to agricultural resources would be similar in both cases. The potential impacts would be considered less than significant in both the Alternative 2 and the proposed Project by following the goals, policies and mitigation measures outlined in the proposed Project. Therefore, the Alternative 2 is considered neither environmentally superior nor inferior to the proposed Project in this regard.

AIR QUALITY

Both Alternative 2 and the proposed Project would allow the development of land uses that would create significant unavoidable impacts related to air quality. In both cases, there would be short-term impacts related to construction emissions, and long-term impacts related to operational emissions. Alternative 2 would allow for an increase of multiple-family residential development, an increase in residential development would likely increase the number of vehicular trips made therefore would contribute to a decrease in air quality due to vehicle emissions. However, in both cases the air quality impacts associated with future development can be mitigated to less than significant levels through adherence to Federal, State and Local regulations as well as the use of goals and policies in the adopted General Plan. In this regard, Alternative 2 is considered neither environmentally superior nor inferior to the proposed Project.

BIOLOGICAL RESOURCES

Both Alternative 2 and the proposed Project have the potential to disturb biological resources due to development of vacant land and the resulting increase in human activity. Therefore impacts to biological resources, either direct species impacts or habitat modifications would be similar between Alternative 2 and the proposed Project. In both cases, it is anticipated that the impacts would be mitigated to less than significant by following appropriate goals, policies and mitigation measures outlined in the proposed Project to protect these biological resources. Therefore, the Alternative 2 is considered neither environmentally superior nor inferior to the proposed Project in this regard.

CULTURAL RESOURCES

Both Alternative 2 and the proposed Project would result in the potential disturbance of historical, archeological, or paleontological resources. Any new development in the City could potentially unearth a cultural artifact and therefore the potential impacts to cultural resources would be similar between Alternative 2 and the proposed Project. However, in both cases, impacts to cultural resources would be less than significant by following appropriate goals, policies and mitigation measures identified in the proposed Project to protect these resources. Therefore, the Alternative 2 is considered neither environmentally superior nor inferior to the proposed Project in this regard.

ENERGY

Since the adoption of the 2011 certified EIR, Appendix G of the CEQA Guidelines has been revised to include significance threshold criteria for energy conservation. Both the Alternative 2 Scenario and the proposed Project propose land use plans that include a reorganized mix of land uses which will help to reduce vehicle miles travelled. Additionally, the proposed Project incorporates additional policies to further prioritize energy conservation, green building and renewable energy. Therefore, the Alternative 2 Scenario is considered neither environmentally superior nor inferior to the proposed Project in this regard.

GEOLOGY AND SEISMIC HAZARDS

Both Alternative 2 and the proposed Project would allow for new development that would create both residential and non-residential land uses. Alternative 2 would allow for more residential development, and less non-residential development than the proposed Project. However, in both cases, new development would increase the number of people and structures that could potentially be impacted by seismic activity. Therefore, the potential impacts by seismic activity would be similar between Alternative

2 and the proposed Project. The impacts associated with seismic activity could be reduced by following the goals, policies and mitigation measures of the proposed Project as well as adhering to applicable building codes. Therefore, Alternative 2 is neither environmentally superior nor inferior to the proposed Project in this regard.

GREENHOUSE GAS EMISSIONS

Similarly to the proposed Project, future development pursuant to the Alternative 2 would result in additional GHG emissions. After implementation of State, federal, and local actions, the forecasted years for the proposed Project do not meet the goals to reduce impacts on climate change. Alternative 2 would likely result in similar GHG emissions; therefore as identified for the proposed Project, without further action from the City, GHG emission reduction targets would not be met. Thus, Alternative 2 is considered neither environmentally superior nor inferior to the proposed Project in this regard.

HAZARDS AND HAZARDOUS MATERIALS

Both Alternative 2 and the proposed Project would allow for the development of residential uses and non-residential uses in close proximity to each other. These non-residential uses could potentially store and/or use hazardous materials. In both cases, the risks of these hazardous materials could be mitigated by implementing and following the goals, policies and mitigation measures in the proposed Project. Therefore, Alternative 2 is considered neither environmentally superior nor inferior to the proposed Project in this regard.

HYDROLOGY, DRAINAGE, AND WATER QUALITY

Alternative 2 and the proposed Project will likely result in development of the same land. The Alternative 2 would allow for an increase in residential uses, however, it would also include a reduction in non-residential uses. Both Alternative 2 and the proposed Project include goals, policies and mitigation measures to ensure impacts are less than significant. Additionally, all new development would need to comply with Federal, State, and Regional governments and agencies to protect and improve the quality of local and regional groundwater resources reduce the impacts of water quality and waste discharge. New development resulting from the either the Alternative 2 or the proposed Project would also be reviewed on a project-by-project bases to ensure that hydrology, drainage and water quality standards were upheld. Therefore, the hydrology, drainage, or water quality impacts from potential future development would be similar in both cases. Therefore, Alternative 2 is considered neither environmentally superior nor inferior to the proposed Project in this regard.

LAND USE

The Alternative 2 revises and updates the existing Land Use Element, similarly to the proposed Project. The Alternative 2 would involve changes to the land use designations within Area 4 as discussed above. Specifically, Alternative 2 allows for additional Multiple-Family Residential uses and less non-residential land uses compared to the proposed Project. However, these land use changes would continue to provide consistent and compatible development within the City. Therefore, Alternative 2 is considered neither environmentally superior nor inferior to the proposed Project in this regard.

MINERAL RESOURCES

Both Alternative 2 and the proposed Project may involve the development of land that contains mineral resources. Therefore, the potential impacts to mineral resources would be similar in both cases. The potential impacts would be considered less than significant in both Alternative 2 and the Project by following the goals, policies and mitigation measures outlined in the proposed Project. Therefore, the Alternative 2 is considered neither environmentally superior nor inferior to the proposed Project in this regard.

NOISE

Both Alternative 2 and the proposed Project propose the development of land throughout the City of Murrieta. In both cases, new development would result in additional short-term noise impacts from construction, as well as long-term noise impacts from operational noise and an increase in traffic. These long-term noise impacts would be significant and unavoidable in both cases as the City grows and new development occurs. Therefore Alternative 2 is considered neither environmentally superior nor inferior to the proposed Project.

POPULATION, HOUSING AND EMPLOYMENT

Both Alternative 2 and the proposed Project would respond to future population and development projections to the year 2035. Although Alternative 2 responds to the residential development patterns in the City, it does not provide the amount of non-residential development needed to achieve the goals and vision of the City in terms of economic development to the extent of the proposed Project. Therefore the Alternative 2 is considered environmentally inferior to the proposed Project in this regard.

PUBLIC SERVICES AND UTILITIES

Both Alternative 2 and the proposed Project would allow for new development

throughout the City, which would result in an increased demand for public services and utilities. In both cases, the impacts to public services and utilities would be considered less than significant by following the goals, policies and mitigation measures outlined in the proposed Project. However, Alternative 2 would allow for an increase in residential development, in particular multiple-family residential. Due to the density of this land use, this would likely result in an increase in population in the area and in turn a higher demand on parks and recreational facilities, as well as school facilities. Therefore the Alternative 2 is considered environmentally inferior to the proposed Project in this regard.

TRAFFIC AND CIRCULATION

The land use plan for Alternative 2 would provide for greater residential dwelling units and less non-residential square footage within Area 4. Based on the similar land use plans and development potential identified for Alternative 2, it is anticipated that similar roadway and intersection impacts would occur. Therefore, Alternative 2 is considered neither environmentally superior nor inferior to the proposed Project in this regard.

TRIBAL CULTURAL RESOURCES

Future development resulting from the implementation of both the Alternative 2 Scenario and the proposed Project may result on the same land and have the potential to impact or affect cultural resources. These potential development projects would need to be evaluated on a case-by-case basis. In both cases, any future development would be required to comply with applicable federal, state, and local regulations, as well as any relevant General Plan goals, policies, and mitigation measures. Therefore, the Alternative 2 Scenario is considered neither environmentally superior nor inferior to the proposed Project in this regard.

WILDFIRE

Development resulting from the implementation of either the Alternative 2 Scenario or the proposed Project would result on the same land and could be exposed to wildfire risks. Since the adoption of the 2011 certified EIR, Appendix G of the CEQA Guidelines has been revised to include significance threshold criteria for wildfire threat. Similarly to the proposed Project, the Alternative 2 Scenario provides policies that address wildfire risks and encourages continued consideration of the impacts to wildfire services. Therefore, the Alternative 2 Scenario is considered neither environmentally superior nor inferior to the proposed Project in this regard.

CONCLUSION

Alternative 2 would result in similar environmental impacts as the proposed Project for aesthetics, agricultural resources, air quality, biological resources, cultural resources,

energy, geology and seismic hazards, greenhouse gas emissions, hazards and hazardous materials, hydrology, drainage and water quality, land use, mineral resources, noise, traffic and circulation, tribal cultural resources, and wildfire. However, this Alternative may generate higher impacts than the proposed Project with respect to population, housing and employment, and public services and utilities. Therefore, Alternative 2 is considered environmentally inferior to the proposed Project.

6.4 Alternative 3 Scenario

6.4.1 Description

Alternative 3 assumes that the proposed Project, including all goals and policies would be adopted; however, the land use designations in Area 4, identified on the General Plan 2035 Land Use Policy Map, Alternative 3 (*refer to Exhibit 6-2*) would provide for greater residential dwelling units and less non-residential square footage when compared to the proposed Project (refer to *Exhibit 3-3*, *General Plan 2035 Land Use Policy Map)*. As such, citywide growth would be the same for both Alternative 3 and the proposed Project outside of Area 4. When compared to the proposed Project, Alternative 3 includes the same mix of land use designations but in different quantities and location within Area 4 with the exception of additional commercial land uses. Alternative 3 would result in approximately 64.6 more acres of residential uses and approximately 64.6 fewer acres non-residential uses.

6.4.2 Impact Evaluation

AESTHETICS

Alternative 3 would allow for more residential and commercial uses, compared to the proposed Project. In both cases, potential future development of this area would result in both short-term and long-term changes to the existing visual character of the area. However, appropriate goals, policies and mitigation measures from the proposed GPU would be followed to ensure that the impact is less than significant. Both Alternative 3 and the proposed Project would encourage preservation of existing residential neighborhoods within the City. Therefore, Alternative 3 is considered neither environmentally superior nor inferior to the proposed Project in this regard.

AGRICULTURAL RESOURCES

Both Alternative 3 and the proposed Project may involve the development of land currently used for agricultural purposes. Therefore, the potential impacts to agricultural resources would be similar in both cases. The potential impacts would be considered less than significant in both Alternative 3 and the proposed Project by following the goals, policies and mitigation measures outlined in the proposed Project. Therefore, the Alternative 3 is considered neither environmentally superior nor inferior to the proposed Project in this regard.

AIR QUALITY

Both Alternative 3 and the proposed Project would allow the development of land uses that would create significant unavoidable impacts related to air quality. In both cases, there would be short-term impacts related to construction emissions, and long-term impacts related to operational emissions. Alternative 3 would allow for an increase of multiple-family residential development, an increase in residential development would likely increase the number of vehicular trips made therefore would contribute to a decrease in air quality due to vehicle emissions. However, in both cases the air quality impacts associated with future development can be mitigated to less than significant levels through adherence to Federal, State and Local regulations as well as the use of goals and policies in the adopted General Plan. In this regard, Alternative 3 is considered neither environmentally superior nor inferior to the proposed Project.

BIOLOGICAL RESOURCES

Both Alternative 3 and the proposed Project have the potential to disturb biological resources due to development of vacant land and the resulting increase in human activity. Therefore impacts to biological resources, either direct species impacts or habitat modifications would be similar between Alternative 3 and the proposed Project. In both cases, it is anticipated that the impacts would be mitigated to less than significant by following appropriate goals, policies and mitigation measures outlined in the proposed Project to protect these biological resources. Therefore, the Alternative 3 is considered neither environmentally superior nor inferior to the proposed Project in this regard.

CULTURAL RESOURCES

Both Alternative 3 and the proposed Project would result in the potential disturbance of historical, archeological, or paleontological resources. Any new development in the City could potentially unearth a cultural artifact and therefore the potential impacts to cultural resources would be similar between Alternative 3 and the proposed Project. However,

in both cases, impacts to cultural resources would be less than significant by following appropriate goals, policies and mitigation measures identified in the proposed Project to protect these resources. Therefore, Alternative 3 is considered neither environmentally superior nor inferior to the proposed Project in this regard.

ENERGY

Since the adoption of the 2011 certified EIR, Appendix G of the CEQA Guidelines has been revised to include significance threshold criteria for energy conservation. Both the Alternative 3 Scenario and the proposed Project propose land use plans that include a reorganized mix of land uses which will help to reduce vehicle miles travelled. Additionally, the proposed Project incorporates additional policies to further prioritize energy conservation, green building and renewable energy. Therefore, the Alternative 3 Scenario is considered neither environmentally superior nor inferior to the proposed Project in this regard.

GEOLOGY AND SEISMIC HAZARDS

Both Alternative 3 and the proposed Project would allow for new development that would create both residential and non-residential land uses. Alternative 3 would allow for more residential development, and less non-residential development than the proposed Project. However, in both cases, new development would increase the number of people and structures that could potentially be impacted by seismic activity. Therefore, the potential impacts by seismic activity would be similar between Alternative 3 and the proposed Project. The impacts associated with seismic activity could be reduced by following the goals, policies and mitigation measures of the proposed Project as well as adhering to applicable building codes. Therefore, Alternative 3 is neither environmentally superior nor inferior to the proposed Project in this regard.

GREENHOUSE GAS EMISSIONS

Similarly to the proposed Project, future development pursuant to Alternative 3 would result in additional GHG emissions. After implementation of State, federal, and local actions, the forecasted years for the proposed Project do not meet the goals to reduce impacts on climate change. Alternative 3 would likely result in similar GHG emissions; therefore as identified for the proposed Project, without further action from the City, GHG emission reduction targets would not be met. Thus, Alternative 3 is considered neither environmentally superior nor inferior to the proposed Project in this regard.

HAZARDS AND HAZARDOUS MATERIALS

Both Alternative 3 and the proposed Project would allow for the development of

residential uses and non-residential uses in close proximity to each other. These non-residential uses could potentially store and/or use hazardous materials. In both cases, the risks of these hazardous materials could be mitigated by implementing and following the goals, policies and mitigation measures in the proposed Project. Therefore, Alternative 3 is considered neither environmentally superior nor inferior to the proposed Project in this regard.

HYDROLOGY, DRAINAGE, AND WATER QUALITY

Alternative 3 and the proposed Project will likely result in development of the same land. The Alternative 3 would allow for an increase in residential uses, however, it would also include a reduction in non-residential uses. Both Alternative 3 and the proposed Project include goals, policies and mitigation measures to ensure impacts are less than significant. Additionally, all new development would need to comply with Federal, State, and Regional governments and agencies to protect and improve the quality of local and regional groundwater resources reduce the impacts of water quality and waste discharge. New development resulting from the either the Alternative 3 or the proposed Project would also be reviewed on a project-by-project bases to ensure that hydrology, drainage and water quality standards were upheld. Therefore, the hydrology, drainage, or water quality impacts from potential future development would be similar in both cases. Therefore, Alternative 3 is considered neither environmentally superior nor inferior to the proposed Project in this regard.

LAND USE

Alternative 3 revises and updates the existing Land Use Element, similarly to the proposed Project. Alternative 3 would involve changes to the land use designations within Area 4 as discussed above. These land use changes would continue to provide consistent and compatible development within the City. Therefore, Alternative 3 is considered neither environmentally superior nor inferior to the proposed Project in this regard.

MINERAL RESOURCES

Both Alternative 3 and the proposed Project may involve the development of land that contains mineral resources. Therefore, the potential impacts to mineral resources would be similar in both cases. The potential impacts would be considered less than significant in both Alternative 3 and the Project by following the goals, policies and mitigation measures outlined in the proposed Project. Therefore, the Alternative 3 is considered neither environmentally superior nor inferior to the proposed Project in this regard.

NOISE

Both Alternative 3 and the proposed Project propose the development of land throughout the City of Murrieta. In both cases, new development would result in additional short-term noise impacts from construction, as well as long-term noise impacts from operational noise and an increase in traffic. These long-term noise impacts would be significant and unavoidable in both cases as the City grows and new development occurs. Therefore Alternative 3 is considered neither environmentally superior nor inferior to the proposed Project.

POPULATION, HOUSING AND EMPLOYMENT

Both Alternative 3 and the proposed Project would respond to future population and development projections to the year 2035. Although Alternative 3 responds to the residential development patterns in the City, it does not provide the amount of non-residential development needed to achieve the goals and vision of the City in terms of economic development to the extent of the proposed Project. Therefore the Alternative 3 is considered environmentally inferior to the proposed Project in this regard.

PUBLIC SERVICES AND UTILITIES

Both Alternative 3 and the proposed Project would allow for new development throughout the City, which would result in an increased demand for public services and utilities. In both cases, the impacts to public services and utilities would be considered less than significant by following the goals, policies and mitigation measures outlined in the proposed Project. However, Alternative 3 would allow for an increase in residential development. Due to the density of this land use, this would likely result in an increase in population in the area and in turn a higher demand on parks and recreational facilities, as well as school facilities. Therefore the Alternative 3 is considered environmentally inferior to the proposed Project in this regard.

TRAFFIC AND CIRCULATION

The land use plan for Alternative 3 would provide for greater residential dwelling units and less non-residential square footage within Area 4. Based on the similar land use plans and development potential identified for Alternative 3, it is anticipated that similar roadway and intersection impacts would occur. Therefore, Alternative 3 is considered neither environmentally superior nor inferior to the proposed Project in this regard.

TRIBAL CULTURAL RESOURCES

Future development resulting from the implementation of both the Alternative 3 Scenario and the proposed Project may result on the same land and have the potential to impact or affect cultural resources. These potential development projects would need to be evaluated on a case-by-case basis. In both cases, any future development would be required to comply with applicable federal, state, and local regulations, as well as any relevant General Plan goals, policies, and mitigation measures. Therefore, the Alternative 3 Scenario is considered neither environmentally superior nor inferior to the proposed Project in this regard.

WILDFIRE

Development resulting from the implementation of either the Alternative 3 Scenario or the proposed Project would result on the same land and could be exposed to wildfire risks. Since the adoption of the 2011 certified EIR, Appendix G of the CEQA Guidelines has been revised to include significance threshold criteria for wildfire threat. Similarly to the proposed Project, the Alternative 3 Scenario provides policies that address wildfire risks and encourages continued consideration of the impacts to wildfire services. Therefore, the Alternative 3 Scenario is considered neither environmentally superior nor inferior to the proposed Project in this regard.

CONCLUSION

Alternative 3 would result in similar environmental impacts as the proposed Project for aesthetics, agricultural resources, air quality, biological resources, cultural resources, energy, geology and seismic hazards, greenhouse gas emissions, hazards and hazardous materials, hydrology, drainage and water quality, land use, mineral resources, noise, traffic and circulation, tribal cultural resources, and wildfire. However, this Alternative may generate higher impacts than the proposed Project with respect to population, housing and employment, and public services and utilities. Therefore, Alternative 3 is considered environmentally inferior to the proposed Project.

6.5 Environmentally Superior Alternative

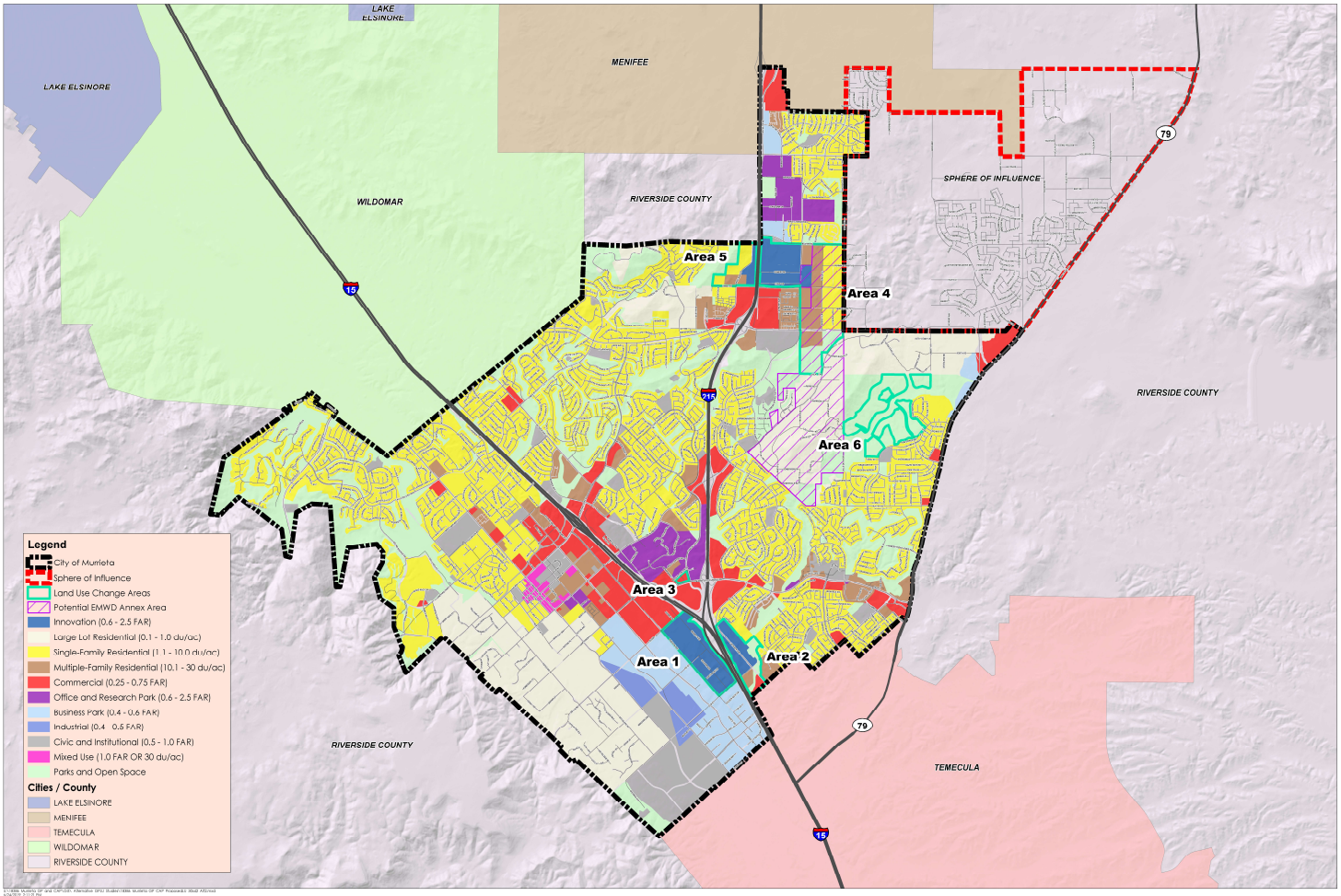
CEQA requires that an “Environmentally Superior Alternative” be identified among those considered; that is an alternative that would result in the fewest or least significant environmental impacts. The environmentally superior alternative is determined based on the consideration of which alternative fulfills the project objective, while also reducing the significant, unavoidable impacts on the surrounding environment.

NO PROJECT ALTERNATIVE

Overall, the No Project Alternative would result in similar environmental impacts as the proposed Project except in terms of air quality, energy, greenhouse gas emissions, hazards and hazardous materials, land use, population, housing and employment, traffic and circulation, and wildfire, which would be considered inferior. The No Project Alternative would be considered environmentally superior in regards to public services and utilities; however, the No Project Alternative does not reduce the significant unavoidable impacts to the environment to the extent that the proposed Project does. Additionally, the No Project Alternative would not address changes in State law enacted since the adoption of the 2011 General Plan. Therefore, the No Project Alternative is not selected as the environmentally superior alternative to the proposed Project.

ALTERNATIVES 2 AND 3 AND THE PROPOSED PROJECT

Alternatives 2 and 3 allow for greater residential development and less non-residential development than the proposed Project. This increase in residential development could result in additional impacts to population, housing and employment, and public services and utilities beyond those identified by the Proposed Project. However, the land use components of Alternatives 2 and 3 are very similar overall to the Proposed Project and the differences in impacts would be minimal. As such, the Environmentally Superior Alternative is the proposed Project; however, as discussed, Alternatives 2 and 3 would be very similar overall to the proposed Project.



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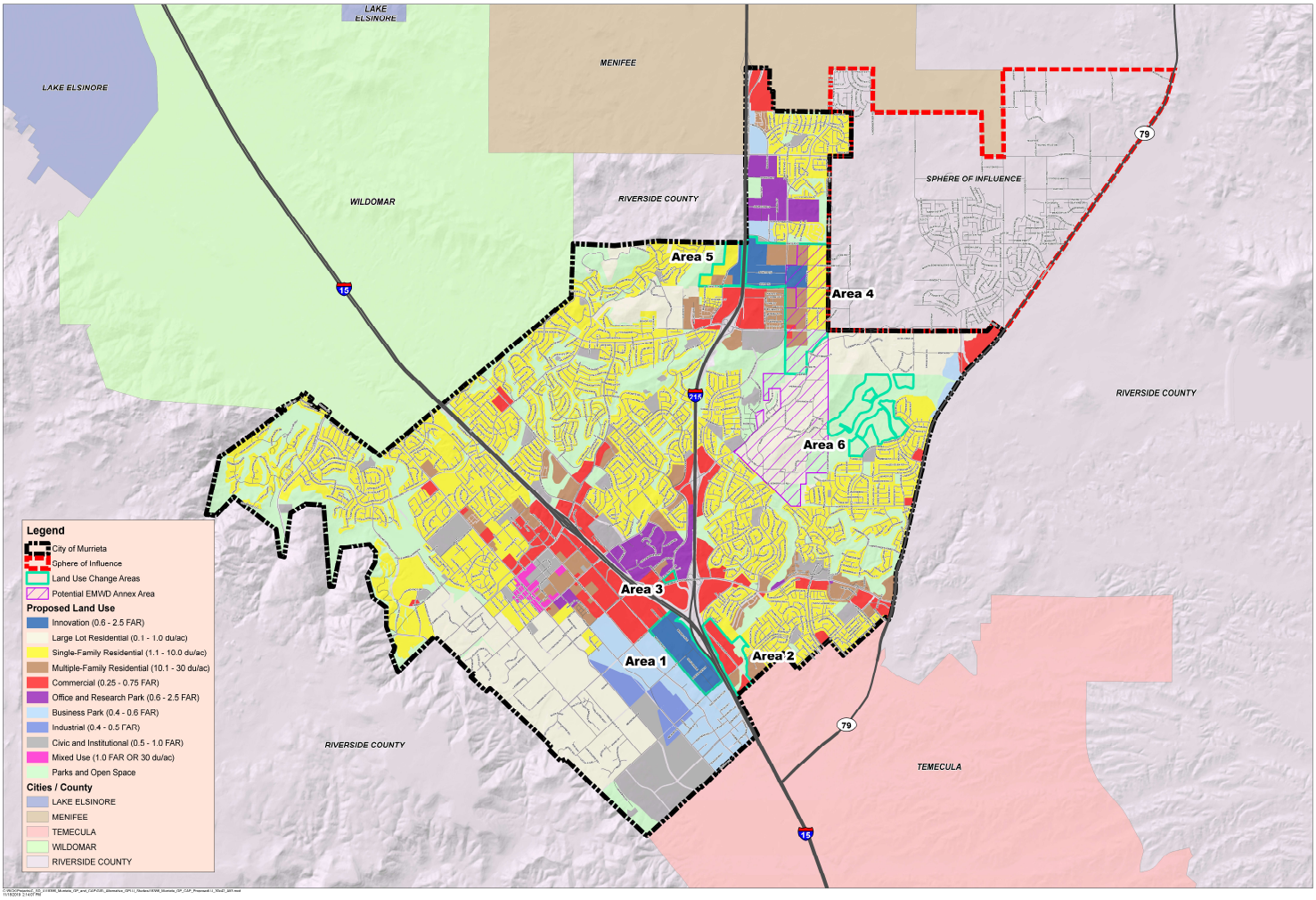
Scale in Feet: 0 2,400 4,800 7,200
North

Date of Exhibit: 08/22/2019
ESRI World Imagery Basemap: 06/04/2016

General Plan 2035 Land Use Policy Map - Alternative 2

Exhibit 6-1



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Scale in Feet

General Plan 2035 Land Use Policy Map - Alternative 3

Exhibit 6-2

7.0 Other CEQA Considerations

Section 7.0 of the 2011 Certified EIR identifies several CEQA considerations related to the implementation of 2011 General Plan, including long term implications, irreversible environmental changes, growth inducing impacts, and energy conservation. Those considerations have been addressed below, to the extent that they are impacted by the proposed Project.

7.1 Long-Term Implications of the Proposed Project

Buildout of the proposed Project would result in the development of the same vacant and underutilized land as was analyzed in the 2011 Certified EIR and would result in the same potential short- and long-term impacts on a local level. During site-specific project grading and construction, portions of surrounding uses may be temporarily impacted by dust and noise and short-term soil erosion. There may also be an increase in vehicle pollutant emissions caused by grading and construction activities. However, these disruptions would be temporary and may be avoided or lessened to a large degree through mitigation cited in the 2011 Certified EIR, as supplemented by this SEIR, and through compliance with the *Murrieta, California Municipal Code*.

Further, in addition to the potential long-term environmental consequences identified in the 2011 Certified EIR, development pursuant to the proposed Project would potentially create increased traffic volumes, increased natural resource consumption, and an incremental degradation of local and regional air quality as a result of mobile source emissions generated from project-related traffic and stationary source emissions.

7.2 Irreversible Environmental Changes that would be Involved with the Proposed Action Should it be Implemented

CEQA Guidelines Section 15126.2(c) requires a discussion of any significant irreversible environmental changes that would be caused by the proposed project, and states:

> *Uses of nonrenewable resources during the initial and continued phases of the project may be irreversible since a large commitment of such resources makes removal or nonuse thereafter unlikely. Primary impacts, and particularly,*

secondary impacts (such as highway improvement which provides access to a previously inaccessible area) generally commit future generations to similar uses. Also, irreversible damage can result from environmental accidents associated with the project. Irretrievable commitments of resources should be evaluated to assure that such current consumption is justified.

The environmental effects of the 2011 General Plan are discussed in Sections 5.0 and 7.0 of the 2011 Certified EIR. These effects are summarized in Section 5.0 of this SEIR and supplemented, to the extent that they are impacted by the proposed Project, in Section 4.0. As discussed in the 2011 Certified EIR, a majority of Murrieta is developed. The 2011 General Plan focused on development in vacant and underutilized areas within the City, allowing for new developments that would entail the irreversible commitment of natural resources, energy, land, and human resources. Buildout of the proposed Project would result in the development of the same vacant and underutilized land and result in the same irreversible commitments. The proposed Project would also result in potential additional long-term impacts from an increase in vehicular traffic and the associated air pollutant emissions.

7.3 Growth Inducing Impacts

CEQA Guidelines Section 15126(d), Growth Inducing Impact of the Proposed Project, requires that an EIR *"discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment."* The *CEQA Guidelines* also indicate that it must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment. This section analyzes potential growth-inducing impacts, based on the criteria outlined below, as suggested in the *CEQA Guidelines*. In general terms, a project may foster spatial, economic, or population growth in a geographic area, if it meets any one of the following criteria:

- Removal of an impediment to growth (e.g., establishment of an essential public service and provision of new access to an area);
- Fostering of economic expansion or growth (e.g., changes in revenue base and employment expansion);
- Fostering of population growth (e.g., construction of additional housing), either directly or indirectly;
- Establishment of a precedent-setting action (e.g., an innovation, a change in zoning and general plan amendment approval); or
- Development of or encroachment on an isolated or adjacent area of open space (being distinct from an in-fill project).

Should a project meet any one of the above-listed criteria, it may be considered growth inducing. The potential growth-inducing impacts of the 2011 General Plan are discussed in Section 7.0 of the 2011 Certified EIR and supplemented below, to the extent that they are impacted by the proposed Project.

As mentioned above, future development pursuant to the proposed Project may result in development of the same vacant and underutilized land analyzed in the 2011 Certified EIR, concentrated along Interstates 15 and 215. Section 5.2 of the 2011 Certified EIR identified the existing population, housing, and employment statistics for the City of Murrieta and evaluated how buildout of the 2011 General Plan would induce population growth in the city, both directly and indirectly, using data from the Southern California Association of Governments (SCAG), U.S. Census 1990 and 2000, and California Department of Finance.

The proposed Project's anticipated change in dwelling units and non-residential square footage over the estimated buildout in the 2011 General Plan is 1,572 additional dwelling units and a reduction of 2,405,601 square feet of non-residential uses. While the proposed Project would result in a slight increase to the number of dwelling units, there would be a substantial reduction in non-residential square footage. As such, the growth forecast between the 2011 General Plan and the proposed Project is relatively consistent. Therefore, the proposed Project is not likely to induce a substantial change in projected population growth from that which was analyzed in the Certified EIR.

In addition, any future development pursuant to the proposed Project would be subject to future review for potential impacts and would further be required to comply with applicable federal, state, and local regulations, relevant General Plan goals and policies, and mitigation measures as identified in Section 5.0 of the 2011 Certified EIR and supplemented in Section 4.0 of this SEIR.

Overall, implementation of the proposed Project would result in similar growth-inducing impacts as identified in Section 7.0 of the 2011 Certified EIR.

8.0 Effects Found Not to Be Significant

Section 15128 of the CEQA Guidelines requires a brief description of any possible significant effects that were determined not to be significant and were not analyzed in detail within the environmental analysis.

This SEIR assesses only those changes in the Project, changes in circumstances, and new information that were not analyzed in the 2011 Certified EIR. Section 4.0, *Environmental Analysis,* evaluates those subject areas for which changes in the Project, changes in circumstances, or new information could result in potential new impacts.

In the course of this evaluation, certain new impacts of the proposed Project were found to be less than significant due to the inability of a project of this scope to create such impacts or the absence of project characteristics producing effects of this type. The following discussion briefly describes the potential new impacts found not to be significant as a result of implementation of the proposed Project. Impacts found not to be significant by the 2011 Certified EIR and not analyzed in this SEIR are summarized in Section 5.0.

8.1 SEIR Conclusions

LAND USE

- Implementation of the proposed Project could disrupt or physically divide an established community.
- Implementation of the proposed Project could cause a significant environmental impact due to a conflict with a land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.
- Development associated with implementation of the proposed Project and cumulative development could result in cumulatively considerable land use impacts.

TRAFFIC

- Implementation of the proposed Project could increase hazards due to a geometric design features or incompatible uses.
- Implementation of the proposed Project could result in inadequate emergency access.

- Implementation of the proposed Project could conflict with CEQA Guidelines Section 15064.3(b).

AIR QUALITY

- The proposed Project may conflict with or obstruct implementation of the applicable air quality plans.
- Implementation of the proposed Project could expose sensitive receptors to substantial pollutant concentrations.
- Implementation of the proposed Project could result in an overall increase in odors within the City.
- Implementation of the proposed Project could result in an overall increase in carbon monoxide hotspot emissions within the City, which could exceed South Coast Air Quality Management District air quality standards.
- The proposed Project may conflict with or hinder implementation of the Southern California Association of Government's Regional Comprehensive Plan Guidelines and the South Coast Air Quality Management District's Air Quality Management Plan.
- Regional air quality emissions resulting from operational buildout (localized air quality and cumulative odor emissions) of the proposed Project could impact regional air quality levels on a cumulatively considerable basis.

GREENHOUSE GASES

- Greenhouse Gas emissions generated by development associated with implementation of the proposed Project could have a significant impact on the environment.
- Implementation of the proposed Project could conflict with an applicable Greenhouse Gas reduction plan, policy, or regulation.
- Greenhouse Gas emissions resulting from development associated with implementation of the proposed Project and cumulative development could impact Greenhouse Gas emissions on a cumulatively considerable basis.

WILDFIRE

- Implementation of the proposed Project could substantially impair an adopted emergency response plan or emergency evacuation plan.
- Due to slope, prevailing winds, and other factors, development associated with the implementation of the proposed Project could exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire.
- Development associated with the implementation of the proposed Project could require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines, or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment
- Development associated with the implementation of the proposed Project could expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes
- Development associated with the implementation of the proposed Project and cumulative development could impact wildfire risks on a cumulatively considerable basis.

9.0 Significant Environmental Effects Which Cannot Be Avoided If The Proposed Action Is Implemented

The *California Environmental Quality Act* (*CEQA*) *Guidelines* Section 15126(b) requires an Environmental Impact Report (EIR) to "describe any significant impacts, including those which can be mitigated but not reduced to a level of insignificance. Where there are impacts that cannot be alleviated without imposing an alternative design, their implications, and the reasons why the project is being proposed, notwithstanding their effect, should be described." These impacts were addressed in Section 9.0 of the 2011 Certified EIR.

This SEIR analyzes only those subject areas for which changes in the Project, changes in circumstances, or new information result in potentially greater impacts than those identified in the 2011 Certified EIR. Section 4.0, *Environmental Analysis*, provides a description of these potential environmental impacts and recommends General Plan policies, implementation measures, and mitigation measures to reduce impacts to a less than significant level. After implementation of the recommended policies, implementation measures, and mitigation measures, most of the potentially significant impacts associated with the proposed Project would be reduced to less than significant levels. However, the following new impacts could not be feasibly mitigated and would result in a significant unavoidable impact associated with approval of the proposed Project.

TRAFFIC AND CIRCULATION

- **Roadway Segments (Project and Cumulative Impacts).** Even with installation of the recommended improvements, implementation of the proposed Project would result in an unacceptable level of service on the following roadway segments:
    - Clinton Keith Road east of California Oaks Road (new deficiency)
    - California Oaks Road south of Clinton Keith Road (new deficiency)
    - Jefferson Avenue south of California Oaks Road (new deficiency)
    - Los Alamos Road between Monroe Avenue and Hancock Avenue (deficient in "without project")
    - Murrieta Hot Springs Road between I-15 and I-215 (deficient in "without project")

  - Murrieta Hot Springs Road between Alta Murrieta Drive and Whitewood Road (deficient in "without project")
  - Murrieta Hot Springs Road between Whitewood Road and Margarita Road (deficient in "without project").

- **Intersections (Project and Cumulative Impacts).** Even with installation of the recommended improvements, implementation of the proposed Project, the following 5 intersections would result in unavoidable traffic impacts, and thus result in an unavoidable significant impact.

  - Jefferson Avenue/Kalmia Street
  - Winchester Road (SR-79)/Murrieta Hot Springs Road
  - Hancock Avenue/Los Alamos Road
  - Whitewood Road/Murrieta Hot Springs Road
  - Whitewood Road/Clinton Keith Road

AIR QUALITY

- Short-Term Construction Emissions
- Long-Term Mobile and Stationary Source Emissions
- Cumulative Short-Term Construction Emissions Impacts
- Cumulative Long-Term Mobile and Stationary Source Emissions

10.0 References

LEAD AGENCY

City of Murrieta
1 Town Square
Murrieta, California 92562

Development Services Department

Jarrett Ramaiya, Interim Development Services Director/City Planner
Carl Stiehl, Senior Planner
Lorie Abeles, Executive Assistant

PREPARERS OF THE ENVIRONMENTAL IMPACT REPORT

RICK Engineering Company (Lead SEIR Consultant)

5620 Friars Road
San Diego, California 92110

Brian F Mooney, FAICP, Project Manager
Brooke Peterson, AICP, Planner
Katherine Duncan, Planner
Shannon Baer, Planner
Hannah Wong, Planner
Mario Terrazas, GIS
Kerri Kress, Graphics

Iteris, Inc. (Traffic)

1700 Carnegie Avenue, Suite 100
Santa Ana, CA 92705

Deepak Kaushik, Associate Vice President

VRPA Technologies, Inc. (VMT Analysis)

9747 Businesspark Avenue, Suite 210
San Diego, CA 92131

Erik Ruehr, Director of Traffic Engineering

Ascent Environmental, Inc. (Air Quality and Greenhouse Gas)

600 B Street, Suite 300
San Diego, CA 92101

Andrew Martin, Senior Environmental Planner
Poonam Boparai, Senior Air Quality and Climate Change Specialist

Morse Planning Group (SEIR Supporting Consultant)

145 North C Street
Tustin, CA 92780

Collette Morse, AICP

CH2 Hill Engineers, Inc (Water)

402 West Broadway, Suite 1450
San Diego, CA 92101

Mark Elliott, PE

Incorporation by Reference

This SEIR incorporates and references several technical studies, analyses, and reports. Information from the following documents, available for public review at the City of Murrieta, Development Services Department, located at 1 Town Square, Murrieta, California 92562, are hereby incorporated by reference pursuant to Section 15148 of the CEQA Guidelines. Information contained within these documents has been utilized for preparation of this SEIR. A list of these documents is provided below:

- Murrieta General Plan, July 19, 2011
- Environmental Impact Report, July 21, 2011
- City of Murrieta Municipal Code, 2019
- Notice of Preparation, Appendix A
- Notice of Preparation Comments, Appendix B
- City of Murrieta General Plan Update, Draft Technical Memorandum: Air Quality and Greenhouse Gas Impact Analysis, February 14, 2020 (Ascent), Appendix C
- City of Murrieta General Plan Update, Water Study for the Murrieta General Plan Update and Eastern Municipal Water District Potential Annex Area, June 2019 (Jacobs), Appendix D
- City of Murrieta Focused General Plan Update Traffic Impact Analysis, August 21, 2019 (Iteris) Appendices E and F
- Draft Murrieta General Plan Update – Vehicle Miles Traveled (VMT) Analysis Memorandum, August 16, 2019 (VRPA), Appendix G

APPENDIX A
NOTICE OF PREPARATION

NOTICE OF PREPARATION

To: Interested Agencies and Organizations (Refer to Attached Distribution List)

Subject: Notice of Preparation of a General Plan Update and a Draft Supplemental Environmental Impact Report

Lead Agency:

Agency Name: City of Murrieta
1 Town Square
City/State/Zip: Murrieta, California 92562
Contact: Jarrett Ramaiya
Phone: 951.461.6060

Consulting Firm:

Firm Name: RICK Engineering Company
Street Address: 5620 Friars Road
City/State/Zip: San Diego, CA 92110
Contact: Brian F Mooney, FAICP
Phone: 619.908.3526

The **CITY OF MURRIETA** will be the Lead Agency and will prepare a supplemental environmental impact report (SEIR) for the project identified below. The City requests your careful review and consideration of this notice, and it invites input and comments from responsible and trustee agencies and interested persons and organizations regarding the preparation of the SEIR. This NOP also gives notice of the public scoping meeting. The City, as Lead Agency, respectfully requests that any Responsible or Trustee Agency responding to this notice reply in a manner consistent with State CEQA Guidelines Section 15082. Comments and suggestions should identify the significant environmental issues, reasonable alternatives, and mitigation measures that should be explored in the SEIR, in addition to whether the responding agency will be a responsible or trustee agency for the proposed project. The project description, location, and the potential environmental effects are contained in the attached materials. A copy of the Initial Study Checklist is not attached. Due to the time limits mandated by State law, your response must be sent at the earliest possible date but *not later than 30 days* after receipt of this notice (*comment period ends March 22, 2019*). Please send your response to **Jarrett Ramaiya, City Planner,** at the address shown above. We will need the name of a contact person in your agency.

Scoping Meeting Time/Location: Saturday, March 16, 2019 from 10 AM to 1 PM at the City of Murrieta Senior Center, 5 Town Square, Murrieta, 92562

Project Title: Murrieta General Plan Update and Draft Supplemental Environmental Impact Report

Project Location: City of Murrieta (City (nearest)) Riverside (County)

Project Description: (brief)
The General Plan Update (GPU) is a focused update of the City's 2011 General Plan. The GPU addresses changes in State law enacted since the adoption of the 2011 General Plan as well as changes to land use designations and the land use policy map in specific areas throughout the City. The Project includes an update to the City's Climate Action Plan (CAP) to address new State and regional goals. A SEIR will be prepared for the GPU and the CAP Update. The GPU will provide the City Council, Planning Commission, City Staff, and the entire community with updated plans to guide the City's decision-making and development processes through 2035.

Date: February 14, 2019

Signature:

Jarrett Ramaiya
Title: City Planner

Telephone: 951.461.6060

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State Clearinghouse **(15 copy of NOP, 1 copy of NOC)**
1400 Tenth Street
Sacramento, CA 95814
Attn: Ken Alex

U.S. Department of the Army
Army Corps of Engineers Environmental Resources Branch
Attn: Planning
915 Wilshire Boulevard
Los Angeles, CA 90017

U.S. Fish & Wildlife Service
Karin Cleary-Rose
777 E Tahquitz Canyon Dr Ste 208
Palm Springs, CA 92262

Department of Fish and Wildlife, Region 6
3602 Inland Empire Blvd, Suite C-220
Ontario, CA 91764

Regional Water Quality Control Board
San Diego Region (9)
9174 Sky Park Court #100
San Diego, CA 92123

South Coast AQMD
21865 East Copley Drive
Diamond Bar, CA 91765-4182
Attn: Al Baez, Program Supervisor
Local Government-CEQA

Riverside Co Transportation Dept
Attn: Trans. Planning Manager
P O Box 1090
Riverside, CA 92502-1090

SCAG
3403 10th Street, Suite 805
Riverside, CA 92501
Attn: Cheryl Leising

Western Riverside Council
of Governments (WRCOG)
3390 University Avenue
Suite 450
Riverside, CA 92501

Riverside Transit Agency
1825 Third Street
Riverside, CA 92517-1968

Riverside County
Habitat Conservation Agency
3390 University Avenue, Suite 450
Riverside, CA. 92501

Riverside Co Flood Control District
1995 Market Street
Riverside, CA 92501
Attn: Mike Wong

Eastern Municipal Water District
Attn: Planning
P O Box 8300
Perris, CA 92572-8300

Southern California Gas Co.
P O Box 3003
Redlands, CA 92373-0306
Attn: Technical Supervisor

Southern California Edison
Attn: Jeremy Goldman
24487 Prielipp Rd.
Wildomar, CA 92595

BLANK

Temecula-Elsinore-Murrieta-Anza
Resource Conservation Dist.
Michael W. Newcomb, Director
P.O. Box 2078
Temecula, CA 92593

Airport Land Use Commission
Attn: John Guerin
4080 Lemon Street, 14th Floor
Riverside, CA 92502

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Murrieta Valley Unified School Dist.
41870 McAlby Ct.
Murrieta, CA 92562
Attn: Bill Olien

Union for a River
Greenbelt Environment
26785 Camino Seco
Temecula, CA 92590
Attn.: Ray Johnson

Regional Conservation Authority
Attn: Charles Landry
3403 Tenth Street, Suite 320
Riverside, CA 92501

U.S. Bureau of Land Management
Palm Springs South Coast Field Office
1201 Bird Center Dr.
Palm Springs, CA 92262

California Dept. of Forestry & Fire
Riverside Unit
210 W. San Jacinto
Perris, CA 92570

California Department of Resources and Recycling
1955 Chicago Avenue, Suite 100
Riverside, CA 92507-2383

Riverside Co. Housing Authority
5555 Arlington Ave.
Riverside, CA 92504

County of Riverside Planning Dept.
P.O. Box 1409
Riverside, CA 92502-1409

Riverside Co. Dept. of Environmental Health
38740 Sky Canyon Dr.
Murrieta, CA 92563

Riverside Co. Transportation & Land Management Agency
Environmental Programs
4080 Lemon St. 2nd Floor
Riverside, CA 92502-1629

Riverside Local Agency Formation Commission
3850 Vine St. #240
Riverside, CA 92507

BLANK

City of Wildomar
Matthew Bassi, Planning Director
23873 Clinton Keith Rd. #201
Wildomar, CA 92595

City of Wildomar
Dan York, Director of Public Works/Eng.
23873 Clinton Keith Rd. #201
Wildomar, CA 92595

City of Temecula
Attn: Community Dev. Department
41000 Main Street
Temecula, CA 92590

City of Temecula
Patrick Thomas, Director of Public Works/Eng.
4100 Main Street
Temecula, CA 92590

Murrieta Police Dept.
Sean Hadden, Chief of Police
2 Town Square
Murrieta, CA 92562

Wildomar Police Dept.
Cpt. Shelley Kennedy-Smith
333 Limited Ave.
Lake Elsinore CA 92530

Temecula Police Dept.
Chief Lisa McConnel
30755-A Auld Road
Murrieta, CA 92563

Riverside County Fire Dept. – Planning Division
Walter Brades, Deputy Fire Marshal
2300 Market St. #150
Riverside, CA 92501

Murrieta Fire Dept.
Scott Ferguson, Fire Chief
41825 Juniper Street
Murrieta, CA 92562

Wildomar Fire Dept.
Todd Phillips, Fire Chief
32637 Gruwell Street
Wildomar, CA 92595

Temecula Fire Dept.
Charlie DeHart, Chief
41000 Main Street
Temecula, CA 92590

Waste Management of Inland Valley
800 S. Temescal St.
Corona, CA 92879

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Attention: MWD Environmental Planning
700 N. Alameda St.
Los Angeles, CA 90012

Murrieta Public Library
8 Town Square
Murrieta, CA 92562

Riverside Co. Assessor County Clerk Recorder
Attn: Peter Aldana
P.O. Box 751
Riverside, CA 92502-0751

Riverside County Waste Mgmt. Dept.
Attn: Planning
14310 Frederick Street
Moreno Valley CA 92553

California Department of Transportation
District 8 –
Planning (MS 722)
464 West 4th Street, 6th Floor
San Bernardino, CA 92401-1400

Dan Silver, Executive Director
Endangered Habitats League
8424 Santa Monica Blvd., Suite A 592
Los Angeles, CA 90069-4267

BLANK

City of Menifee
Community Dev Department
29714 Haun Road
Menifee CA 92586

City of Menifee
Jonathan G. Smith Director of Public Works/Engineering
29714 Haun Road
Menifee CA 92586

Menifee Union School District
Robert Wolfe
30205 Menifee Road
Menifee CA 92584

Perris Union High School District
District Administrative Center
155 East 4th Street
Perris CA 92570

Riverside County Transportation Commission
4080 Lemon Street 3rd Floor
Riverside CA 92501

Building Industry Association
Riverside County Chapter
3891 11th Street
Riverside CA 92501

California Native American Heritage Commission
1550 Harbor Blvd Suite 100
West Sacramento CA 95691

State Water Resources Control Board
PO Box 100
Sacramento CA 95812-0100

Scott Cozart, Chairperson
Soboba Band of Luiseno Indians
P.O Box 487
San Jacinto, CA 92583

Cody J. Martinez, Chairperson
Sycuan Band of the Kumeyaay Nation
1 Kwaaypaay Court
El Cajon, CA 92019

Jeff Grubbe, Chairperson
Agua Caliente Band of Cahuilla Indians
5401 Dinah Shore Drive
Palm Springs, CA 92264

Allen Lawson, Chairperson
San Pasqual Band of Diegueno Mission Indians
P.O. Box 365
Valley Center, CA 92082

Robert Welch, Chairperson
Viejas Band of Kumeyaay Indians
1 Viejas Grade Road
Alpine, CA 91901

Steven Estrada, Chairperson
Santa Rosa Band of Cahuilla Indians
P.O. Box 391820
Anza, CA 92539

Jim McPherson, Tribal Historic Preservation Officer
Ricnon Band of Luiseno Indians
One Government Center Lane
Valley Center, CA 92082

San Luis Rey, Tribal Council
San Luis Rey Band of Mission Indians
1889 Sunset Drive
Vista, CA 92081

Thomas Tortez, Chairperson
P.O Box 1160
Thermal, CA 92274

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Joseph Hamilton, Chairperson
Ramona Band of Cahuilla
P.O. Box 391670
Anza, CA 92539

Robert Martin, Chairperson
Morongo Band of Mission Indians
12700 Pumarra Road
Banning, CA 92220

Bo Mazzetti, Chairperson
Rincon Band of Luiseno Indians
One Government Center Lane
Valley Center, CA 92082

Mario Morales, Cultural Resources Representative
Mesa Grande Band of Diegueno Mission Indians
PMB 366 35008 Pala Temecula Diegueno Rd.
Pala, CA 92059

Mark Macarro, Chairperson
Pechanga Band of Luiseno Indians
P.O. Box 1477
Temecula, CA 92593

Michael Linton, Chairperson
Mesa Grande Band of Diegueno Mission Indians
P.O. Box 270
Santa Ysabel, CA 92070

Robert Smith, Chairperson
Pala Band of Mission Indians
35008 Pala Temecula Rd
Pala, CA 92059

Angela Elliott Santos, Chairperson
Manzanita Band of Kumeyaay Nation
P.O. Box 1302
Boulevard, CA 91905

Temet Aguilar, Chairperson
Pauma Band of Luiseno Indians
P.O. Box 369
Pauma Valley, CA 92061

Michael Garcia, Vice Chairperson
Ewiiaapaayp Tribe
4054 Willows Rd.
Alpine, CA 91901

Javaughn Miller, Tribal Administrator
La Posta Band of Diegueno Mission Indians
P.O. Box 1120
Boulevard, CA 91905

Shane Chapparosa, Chairperson
Los Coyotes Band of Cahuilla and Cupeno Indians
P.O. Box 189
Warner Springs, CA 92086-0189

Fred Nelson, Chairperson
La Jolla Band of Luiseno Indians
22000 Highwya 76
Pauma Valley, CA 92061

Ralph Goff, Chairperson
Campo Band of Diegueno Mission Indians
36190 Church Road, Suite 1
Campo, CA 91906

La Posta Band of Diegueno Mission Indians
Gwendolyn Parada, Chairperson
P.O. Box 1120
Boulevard, CA 91905

Doug Welmas, Chairperson
Cabazon Band of Mission Indians
84-245 Indio Springs Parkway

Lisa Cumper, Tribal Historic Preservation Officer
P.O. Box 612
Jamul, CA 91935

Daniel Salgado, Chairperson
Cahuilla Band of Indians
52701 U.S. Highway 371
Anza, CA 92539

Robert Pinto, Chairperson
Ewiiaapaayp Tribe
4054 Willows Rd.
Alpine, CA 91901

Amanda Vance, Chairperson
Augustine Band of Cahuilla Mission Indians
P.O Box 846
Coachella, CA 92236

Erica Pinto, Chairperson
Jamul Indian Village
P.O. Box 612
Jamul, CA 91935

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Note, unless specified, all agencies will receive 1 NOP

Nicole Cory
P.O. Box 2188
Temecula, CA 92598

Joan Amaral
29675 Etienne Circle
Murrieta, CA 92563

Sanford M. Bailey
35780 Arendt Ln
Murrieta, CA 92563

Pablo Barriga
2891 Joann Ln.
Murrieta, CA 92563

Jim Bennet
35125 Meniffe Road
Murrieta, CA 92563

Barbara Biscamenti
35960 Arendt Ln
Murrieta, CA 92563

Patti Castillo
27784 Bottle Brush Way
Murrieta, CA 92562

Richard A. Chmielewski
26291 Jasmine Ave.
Murrieta, CA 92563

Mike Cole
1438 Dorothea Rd.
La Habra Heights 90631

Steve Dodd
28750 Skipper Rd.
Murrieta, CA 92536

Joyce Dodd
28750 Skipper Rd.
Murrieta, CA 92536

Kevin Dodd
39710 Almansa Ct.
Murrieta, CA 92562

Billie Dodd
39710 Almansa Ct.
Murrieta, CA 92562

Andy Domenigoni
31851 Winchester Rd.
Winchester, CA 92596

Ward Fanklin
36085 Los Alamos Rd
Murrieta, CA 92563

Dan Felkins
35647 Epple St.
Murrieta, CA 92563

Carlos Garcia
28400 Mary Pl.
Murrieta, CA 92563

Shermeena Grimsby
29614 Big Dipper Way
Murrieta, CA 92563

Anthony Grimsby
29614 Big Dipper Way
Murrieta, CA 92563

Marie Hannaman
35435 Twin Willow Rd

Paul Herold
32062 Camino Nunez
Temecula, CA 92592

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Randy Holbert
37290 Los Alamos Rd.
Murrieta, CA 92563

Shawn Horwitz
36599 Los Alamos Rd.
Murrieta, CA 92563

Justine Howard
2707 Hilltop Dr.
Newport Beach, CA 92660

Tammy Huttons
28745 Baxter Rd.
Murrieta, CA 92563

Caitlin Jansson
37762 Peregrine Pl.
Murrieta, CA 92563

Curt Jansson
802 East Mission Rd.
Temecula, CA 92562

Rick Jemisin
40020 Calle Bandido
Murrieta, CA 92562

James King
28805 Los Alamos Heights Rd
Murrieta, CA 92563

Josh Knight
28428 Ficus Ct.
Murrieta, CA 92563

Norman Lee
35256 McElwain Rd.
Murrieta, CA 92562

Akinee Maclin
28603 Lunaria Court
Murrieta, CA 92563

Melvin Maclin
28603 Lunaria Court
Murrieta, CA 92563

Rene Maderafont
28555 Running Rabbit Road
Murrieta, CA 92563

Cindy Maderafont
27890 Clinton Keith Rd. D307
Murrieta, CA 92562

Bret Major
4631 Torry Circle 0-102
San Diego, CA 92130

Rhouda Mitchell
35600 Mitchell Road
Murrieta, CA 92562

Virendra Mohan Sood
944 Springwood Ln
Murrieta, CA 92563.

Troy Mors
26272 Tiger Lilly Ave.
Murrieta, CA 92563

Bill Mucelli
35862 Capra Rd.
Murrieta, CA 92563

Nayef Muhtaseb
P.O. Box 1004
Murrieta, CA 92564

Dr. Majed Muhtaseb
P.O. Box 281 Yorba Linda
CA 92885

NOTICE OF PREPARATION DISTRIBUTION LIST
FOR
DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT REPORT

Note, unless specified, all agencies will receive 1 NOP

Sherrie Munroe
25397 Blackthorne Dr.
Murrieta, CA 92563

San Phong
13723 Carleton Drive
Cerritos, CA 90703

Ted Phong
2205 North 4th
Upland, CA 91784

Ken Pryce
1573 Malaya Way
Murrieta, CA 92563

Eva Quiroz
2813 Celia Rd
Murrieta, CA 92563

Rigoberto Quiroz
28135 Celia Rd.
Murrieta, CA 92563

Larry Ranperthal
35520 Epple St.
Murrieta, CA 92563

Dan Restifo
16863 Palmero Dr.
San Diego, CA 92128

Kim Reynolds
28950 Courtney Brook Ln.
Murrieta, CA 92563

Dana Rice
34812 Star Jasmine Place
Murrieta, CA 92563

Ron and Karla Roberts
36320 Liberty Rd.
Murrieta, CA 92563

Brenda Schroeder
29900 Porth Rd.
Murrieta, CA 92563

Duane Scofield
28885 Baxter Rd.
Murrieta, CA 92563

Nesanne Seibert
23905 Clinton Keith 114-414
Wildomar, CA 92595

Sheryl Spiller
1675 Virginia Rd.
Los Angeles, CA 90019

Gayle Vergara
29675 Etienne Circle
Murrieta, CA 92563

Mike Wall
35350 Twin Willow Rd.
Murrieta, CA 92563

Vanessa Wierenga
23721 Hollingswerth Dr.
Murrieta, CA 92562

Lou Lollio
7817 Ivanhoe Avenue, Ste 101
La Jolla, CA 92037

Riverside Local Agency Formation Commission
6216 Brockton Avenue
Riverside, CA 92506

NOTICE OF PREPARATION

CITY OF MURRIETA
GENERAL PLAN UPDATE AND SUPPLEMENTAL ENVIRONMENTAL IMPACT REPORT

LEAD AGENCY:

City of Murrieta
Development Services Department
1 Town Square
Murrieta, California 92562
Contact: Jarrett Ramaiya
Phone 951.461.6060

PREPARED BY:

RICK Engineering Company
5620 Friars Road
San Diego, CA 92110

Contacts: Brian F Mooney, FAICP
619.908.3526

February 14, 2019

PROJECT INFORMATION PACKET

I. INTRODUCTION

Pursuant to *CEQA Guidelines* Section 15082, the City of Murrieta has distributed this Notice of Preparation/Project Information Packet for the Murrieta General Plan Update (GPU) and draft Supplemental Environmental Impact Report (SEIR).

The sections that follow describe the City's location in the region, the project description and list the issue areas to be evaluated through a SEIR, which will be prepared in accordance with *CEQA Guidelines* Section 15163.

II. REGIONAL LOCATION

The City of Murrieta is located in southeastern Riverside County, and is comprised of 26,852 acres (41.96 square miles) of which 21,511 acres (33.61 square miles) is located within the City Limits and 5,341 acres (8.34 square miles) is located within the City's Sphere of Influence. Surrounding cities include Menifee to the north, Temecula to the south and east, Wildomar to the west, and unincorporated Riverside County to the north, south, and east. The San Diego County border is just south of Temecula, and Orange County lies on the other side of the Santa Ana Mountains to the west. Regional access to the City is provided by the Interstates 15 and 215; refer to Exhibit 1, Regional Location Map. Exhibit 2, General Plan 2035 Land Use Policy Map, depicts the City's draft land use plan.

III. GENERAL PLAN UPDATE PROJECT DESCRIPTION

The City's existing 2011 General Plan is a policy document designed to guide the City of Murrieta in achieving its social, physical, and economic goals. It is Murrieta's fundamental policy document regarding community and economic development of the City. The City's existing General Plan describes Murrieta's goals and policies regarding land use, economic development, circulation, infrastructure, healthy communities, conservation, recreation and open space, air quality, noise, safety, and housing. Along with these goals and policies is an implementation program to guide the execution of the goals and policies. The City's 2011 General Plan consists of the following State mandated and/or optional elements: Land Use, Economic Development, Circulation, Infrastructure, Healthy Community, Conservation, Recreation and Open Space, Air Quality, Noise, Safety and Housing.

The GPU is a focused update of the City's 2011 General Plan. Major components of the GPU include:

- Additions, deletions, or modifications to the 2011 General Plan goals, policies, exhibits and implementation to address changes in State law enacted since the adoption of the 2011 General Plan
- Update of General Plan development projections to the year 2035
- Update of the Land Use Element with a new land use designation (Innovation) and a

revised mix and location of land use designations in six key areas as shown on General Plan Land Use Policy Map (Exhibit 2)
- Elimination of focus areas and incorporation of focus area policies/goals into other sections of the GPU, as appropriate.

The GPU's anticipated change in dwelling units and non-residential square feet over the 2035 estimated buildout from the 2011 General Plan[1] is:

- Addition of 1,572 dwelling units
- Reduction of 2,405,601 square feet of non-residential uses

The work program also includes an update to the City's CAP to address new State and regional goals since the adoption of the 2011 CAP and it will analyze the proposed changes to land use designations in certain areas within the City as part of the GPU. Major components of the CAP Update include:

- Update of emissions inventory, projections, targets, and GHG reduction strategies and measures
- Consistency with the GPU land use designation changes and growth forecasts as well as state and regional goals

The GPU will provide the City Council, Planning Commission, City Staff, and the entire community with updated plans to guide the City's decision-making and development processes through 2035.

IV. SUPPLEMENTAL ENVIRONMENTAL IMPACT REPORT PROJECT DESCRIPTION

The SEIR shall evaluate potential environmental impacts resulting from the following revisions/updates to the City's General Plan and Climate Action Plan, including, but not limited to:

- Revisions to exhibits, maps, graphics, charts, tables, and text to reflect updated data/information
- Updates to traffic, air quality, greenhouse gas data
- Analysis related to the possible future annexation of an area identified on Exhibit 2 into the Eastern Municipal Water District (EMWD). No annexation into the EMWD is proposed as part of the Project; however, the SEIR will include a facilities assessment that the Riverside Local Agency Formation Commission would require as part of the information needed for a future annexation request by the City.

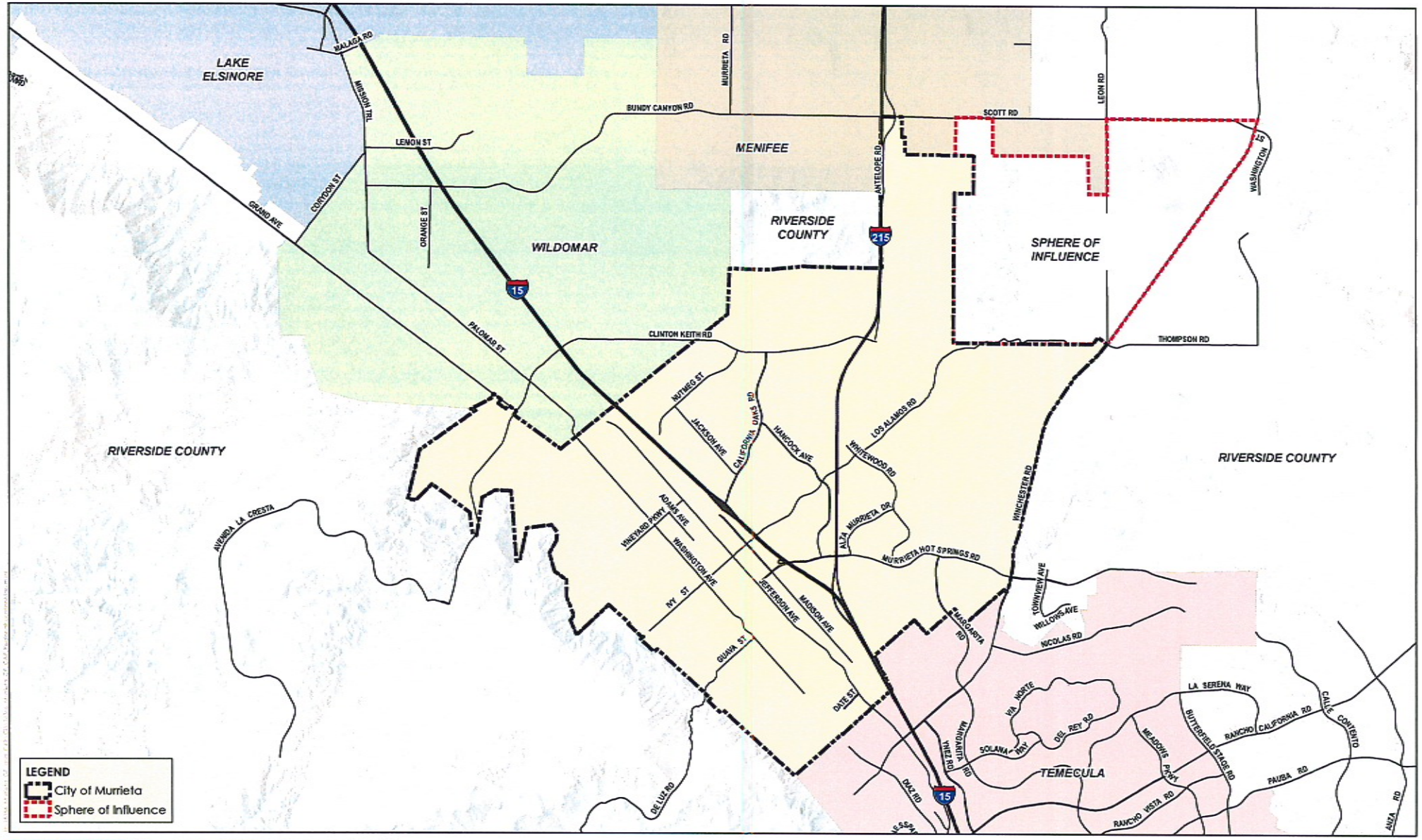
[1] Includes 2018 land use designation acreages.

V. POTENTIAL ENVIRONMENTAL EFFECTS

The SEIR will focus on the following environmental issues:

I. Aesthetics
II. Agriculture and Forestry Resources
III. Air Quality
IV. Biological Resources
V. Cultural Resources
VI. Energy
VII. Geology and Soils
VIII. Greenhouse Gas Emissions
IX. Hazards and Hazardous Materials
X. Hydrology and Water Quality
XI. Land Use and Planning
XII. Mineral Resources
XIII. Noise
XIV. Population and Housing
XV. Public Services
XVI. Recreation
XVII. Transportation
XVIII. Tribal Cultural Resources
XIX. Utilities and Service Systems
XX. Wildfire
XXI. Mandatory Findings of Significance

Due to the decision to prepare an SEIR, an Initial Study was not prepared. This option is permitted under *CEQA Guidelines* Section 15063, which states that if the Lead Agency determines an SEIR will be required for a project, the Lead Agency may skip further initial review and begin work on the EIR.



RICK ENGINEERING COMPANY

Scale in Feet

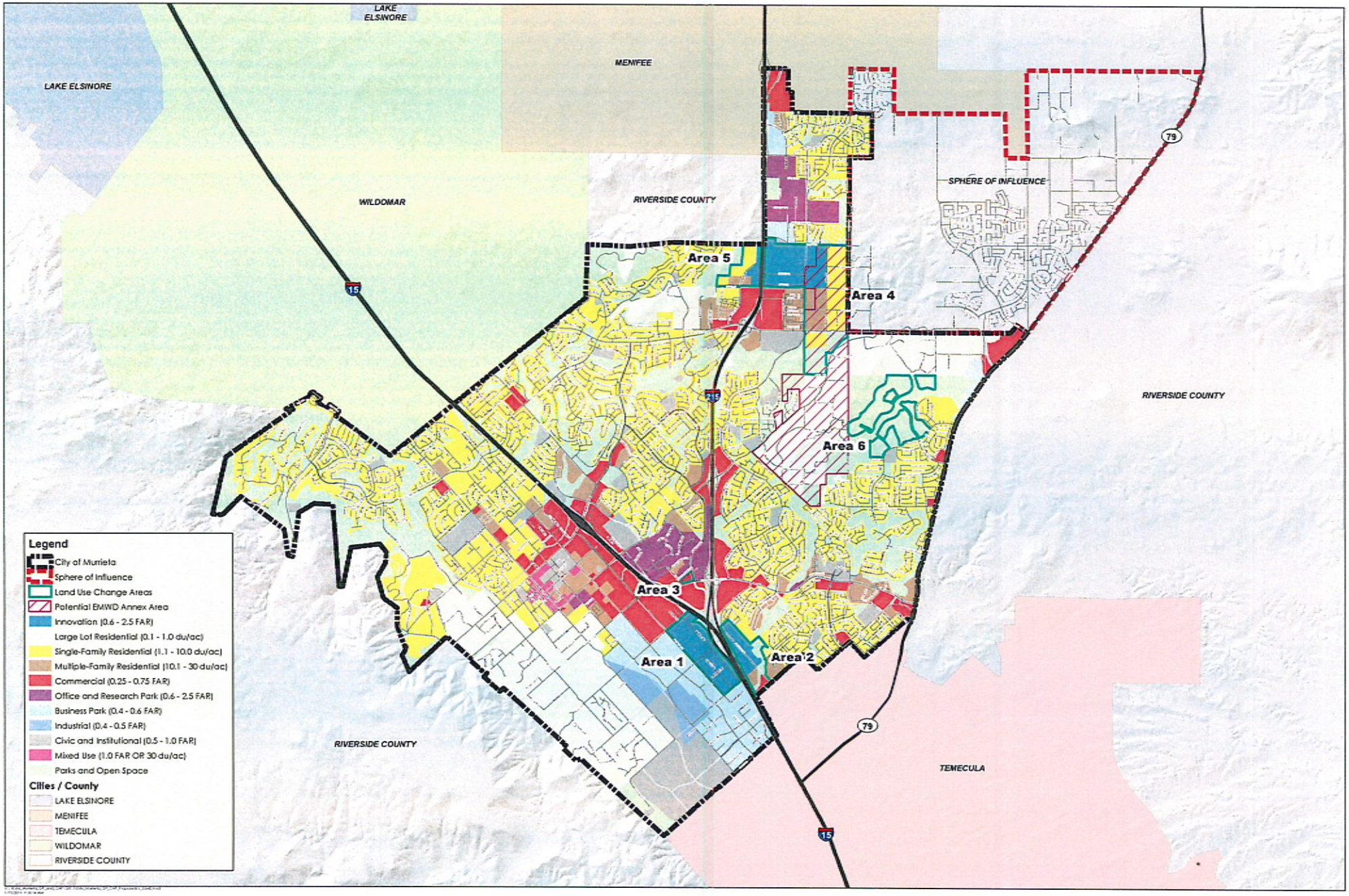
0 6,000 12,000

North

Date of Exhibit: 1/10/2019
ESRI World Imagery & World Transportation Basemaps

Regional Location Map

Exhibit 1



RICK ENGINEERING COMPANY
www.rickengineering.com

Scale in Feet
0 2,400 4,800 7,200

General Plan 2035 Land Use Policy Map

Exhibit 2

STATE OF CALIFORNIA

Governor's Office of Planning and Research

State Clearinghouse and Planning Unit

Gavin Newsom
Governor

Kate Gordon
Director

Notice of Preparation

February 19, 2019

RECEIVED
FEB 26 2019
CITY OF MURRIETA
DEVELOPMENT SERVICES DEPT
PLANNING DIVISION

To: Reviewing Agencies

Re: Murrieta General Plan Update
SCH# 2010111084

Attached for your review and comment is the Notice of Preparation (NOP) for the Murrieta General Plan Update draft Environmental Impact Report (EIR).

Responsible agencies must transmit their comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOP from the Lead Agency. This is a courtesy notice provided by the State Clearinghouse with a reminder for you to comment in a timely manner. We encourage other agencies to also respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

Jarrett Ramaiya
City of Murrieta
1 Town Square
Murrieta, CA 92562

with a copy to the State Clearinghouse in the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the environmental document review process, please call the State Clearinghouse at (916) 445-0613.

Sincerely,

Scott Morgan
Director, State Clearinghouse

Attachments
cc: Lead Agency

1400 TENTH STREET P.O. BOX 3044 SACRAMENTO, CALIFORNIA 95812-3044
TEL 1-916-445-0613 state.clearinghouse@opr.ca.gov www.opr.ca.gov

Document Details Report
State Clearinghouse Data Base

SCH# 2010111084
Project Title Murrieta General Plan Update
Lead Agency Murrieta, City of

Type NOP Notice of Preparation

Description The GPU is a focused update of the City's 2011 General Plan. The GPU addresses changes in State Law enacted since the adoption of the 2011 GP as well as changes to LUD and the land use policy map in specific areas throughout the city. The program also includes an update to the existing Climate Action Plan (CAP) to address new State and regional goals. A SEIR will be prepared for the GPU. The GPU will provide the city council, planning commission, city staff, and the entire community with updated plans to guide the city's decision-making and development processes through 2035.

Lead Agency Contact

Name Jarrett Ramaiya
Agency City of Murrieta
Phone 951-461-6060 **Fax**
email
Address 1 Town Square
City Murrieta **State** CA **Zip** 92562

Project Location

County Riverside
City Murrieta
Region
Cross Streets
Lat / Long
Parcel No.
Township **Range** **Section** **Base**

Proximity to:

Highways Hwy 15, 215
Airports Yes
Railways
Waterways Yes
Schools Yes
Land Use Multiple General Plan and Zoning Designations

Project Issues Biological Resources; Drainage/Absorption; Economics/Jobs; Forest Land/Fire Hazard; Geologic/Seismic; Minerals; Noise; Population/Housing Balance; Public Services; Recreation/Parks; Schools/Universities; Septic System; Sewer Capacity; Soil Erosion/Compaction/Grading; Solid Waste; Toxic/Hazardous; Traffic/Circulation; Vegetation; Water Quality; Water Supply; Wetland/Riparian; Growth Inducing; Landuse; Cumulative Effects; Aesthetic/Visual; Agricultural Land; Air Quality; Archaeologic-Historic; Fiscal Impacts; Flood Plain/Flooding

Reviewing Agencies Resources Agency; Department of Conservation; Cal Fire; Office of Historic Preservation; Department of Parks and Recreation; Department of Fish and Wildlife, Region 6; Office of Emergency Services, California; Department of Housing and Community Development; Native American Heritage Commission; State Lands Commission; Caltrans, Division of Aeronautics; California Highway Patrol; Caltrans, District 8; Regional Water Quality Control Board, Region 9; State Water Resources Control Board, Division of Drinking Water; Department of Toxic Substances Control

Date Received 02/19/2019 **Start of Review** 02/19/2019 **End of Review** 03/20/2019

Note: Blanks in data fields result from insufficient information provided by lead agency.

Print Form

Appendix C

Notice of Completion & Environmental Document Transmittal

2010111084

Mail to: State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

Project Title: Murrieta General Plan Update

Lead Agency: City of Murrieta — Contact Person: Jarrett Ramaiya

Mailing Address: 1 Town Square — Phone: 951.461.6060

City: Murrieta — Zip: 92562 — County: Riverside

Project Location: County: Riverside — City/Nearest Community: Murrieta

Cross Streets: City-wide — Zip Code: ____

Longitude/Latitude (degrees, minutes and seconds): ____° ____′ ____″ N / ____° ____′ ____″ W — Total Acres: 26,852

Assessor's Parcel No.: ____ Section: ____ Twp.: ____ Range: ____ Base: ____

Within 2 Miles: State Hwy #: 15, 215 — Waterways: Yes

Airports: Yes — Railways: ____ — Schools: Yes

Document Type:

CEQA: ☒ NOP ☐ Draft EIR ☐ Early Cons ☐ Supplement/Subsequent EIR ☐ Neg Dec (Prior SCH No.) ____ ☐ Mit Neg Dec Other: ____

NEPA: ☐ NOI ☐ EA ☐ Draft EIS ☐ FONSI

Other: ☐ Joint Document ☐ Final Document ☐ Other: ____

Governor's Office of Planning & Research

Local Action Type:

☒ General Plan Update ☐ General Plan Amendment ☐ General Plan Element ☐ Community Plan

☐ Specific Plan ☐ Master Plan ☐ Planned Unit Development ☐ Site Plan

☐ Rezone ☐ Prezone ☐ Use Permit ☐ Land Division (Subdivision, etc.)

FEB 19 2019

STATE CLEARINGHOUSE

☐ Annexation ☐ Redevelopment ☐ Coastal Permit ☒ Other: CAP Update

Development Type:

☐ Residential: Units 45,923 Acres 9,961

☐ Office: Sq.ft. ____ Acres ____ Employees ____

☐ Commercial: Sq.ft. ____ Acres ____ Employees ____

☐ Industrial: Sq.ft. ____ Acres ____ Employees ____

☐ Educational: ____

☐ Recreational: ____

☐ Water Facilities: Type ____ MGD ____

☐ Transportation: Type ____

☐ Mining: Mineral ____

☐ Power: Type ____ MW ____

☐ Waste Treatment: Type ____ MGD ____

☐ Hazardous Waste: Type ____

☒ Other: 46,359,173 SF of non-residential uses on 4,344.3 acres

Project Issues Discussed in Document:

☒ Aesthetic/Visual
☒ Agricultural Land
☒ Air Quality
☒ Archeological/Historical
☒ Biological Resources
☐ Coastal Zone
☒ Drainage/Absorption
☒ Economic/Jobs
☒ Fiscal
☒ Flood Plain/Flooding
☒ Forest Land/Fire Hazard
☒ Geologic/Seismic
☒ Minerals
☒ Noise
☒ Population/Housing Balance
☒ Public Services/Facilities
☒ Recreation/Parks
☒ Schools/Universities
☒ Septic Systems
☒ Sewer Capacity
☒ Soil Erosion/Compaction/Grading
☒ Solid Waste
☒ Toxic/Hazardous
☒ Traffic/Circulation
☒ Vegetation
☒ Water Quality
☒ Water Supply/Groundwater
☒ Wetland/Riparian
☒ Growth Inducement
☒ Land Use
☒ Cumulative Effects
☐ Other: ____

Present Land Use/Zoning/General Plan Designation:

General Plan and Climate Action Plan Updates

Project Description: *(please use a separate page if necessary)*

The General Plan Update (GPU) is a focused update of the City's 2011 General Plan. The GPU addresses changes in State law enacted since the adoption of the 2011 General Plan as well as changes to land use designations and the land use policy map in specific areas throughout the City. The program also includes an update to the existing Climate Action Plan (CAP) to address new State and regional goals. A SEIR will be prepared for the GPU. The GPU will provide the City Council, Planning Commission, City Staff, and the entire community with updated plans to guide the City's decision-making and development processes through 2035.

Note: The State Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

Reviewing Agencies Checklist

Lead Agencies may recommend State Clearinghouse distribution by marking agencies below with and "**X**".
If you have already sent your document to the agency please denote that with an "**S**".

_____ Air Resources Board
_____ Boating & Waterways, Department of
_____ California Emergency Management Agency
_____ California Highway Patrol
_____ Caltrans District # _____
_____ Caltrans Division of Aeronautics
_____ Caltrans Planning
_____ Central Valley Flood Protection Board
_____ Coachella Valley Mtns. Conservancy
_____ Coastal Commission
_____ Colorado River Board
_____ Conservation, Department of
_____ Corrections, Department of
_____ Delta Protection Commission
_____ Education, Department of
_____ Energy Commission
_____ Fish & Game Region # _____
_____ Food & Agriculture, Department of
_____ Forestry and Fire Protection, Department of
_____ General Services, Department of
_____ Health Services, Department of
_____ Housing & Community Development
_____ Native American Heritage Commission

_____ Office of Historic Preservation
_____ Office of Public School Construction
_____ Parks & Recreation, Department of
_____ Pesticide Regulation, Department of
_____ Public Utilities Commission
_____ Regional WQCB # _____
_____ Resources Agency
_____ Resources Recycling and Recovery, Department of
_____ S.F. Bay Conservation & Development Comm.
_____ San Gabriel & Lower L.A. Rivers & Mtns. Conservancy
_____ San Joaquin River Conservancy
_____ Santa Monica Mtns. Conservancy
_____ State Lands Commission
_____ SWRCB: Clean Water Grants
_____ SWRCB: Water Quality
_____ SWRCB: Water Rights
_____ Tahoe Regional Planning Agency
_____ Toxic Substances Control, Department of
_____ Water Resources, Department of

_____ Other: _____
_____ Other: _____

Local Public Review Period (to be filled in by lead agency)

Starting Date February 20, 2019 Ending Date March 22, 2019

Lead Agency (Complete if applicable):

Consulting Firm: RICK Engineering
Address: 5260 Friars Road
City/State/Zip: San Diego
Contact: Mr. Brian F Mooney, FAICP
Phone: 619.291.0707

Applicant: City of Murrieta
Address: 1 Town Square
City/State/Zip: Murrieta, CA 92562
Phone: 951.461.6060

Signature of Lead Agency Representative: _____ **Date:** 2/14/19

Authority cited: Section 21083, Public Resources Code. Reference: Section 21161, Public Resources Code.

NOP Distribution List

County: Riverside

SCH# 2010111084

esources Agency

- [x] **Resources Agency**
  Nadell Gayou
- [ ] **Dept. of Boating & Waterways**
  Denise Peterson
- [ ] **California Coastal Commission**
  Allyson Hitt
- [ ] **Colorado River Board**
  Elsa Contreras
- [x] **Dept. of Conservation**
  Crina Chan
- [x] **Cal Fire**
  Dan Foster
- [ ] **Central Valley Flood Protection Board**
  James Herota
- [x] **Office of Historic Preservation**
  Ron Parsons
- [x] **Dept of Parks & Recreation**
  Environmental Stewardship Section
- [ ] **S.F. Bay Conservation & Dev't. Comm.**
  Steve Goldbeck
- [ ] **Dept. of Water Resources**
  Resources Agency
  Nadell Gayou

Fish and Game

- [ ] **Depart. of Fish & Wildlife**
  Scott Flint
  Environmental Services Division
- [ ] **Fish & Wildlife Region 1**
  Curt Babcock
- [ ] **Fish & Wildlife Region 1E**
  Laurie Harnsberger
- [ ] **Fish & Wildlife Region 2**
  Jeff Drongesen
- [ ] **Fish & Wildlife Region 3**
  Craig Weightman
- [ ] **Fish & Wildlife Region 4**
  Julie Vance
- [ ] **Fish & Wildlife Region 5**
  Leslie Newton-Reed
  Habitat Conservation Program
- [x] **Fish & Wildlife Region 6**
  Tiffany Ellis
  Habitat Conservation Program
- [ ] **Fish & Wildlife Region 6 I/M**
  Heidi Calvert
  Inyo/Mono, Habitat Conservation Program
- [ ] **Dept. of Fish & Wildlife M**
  William Paznokas
  Marine Region

Other Departments

- [ ] **California Department of Education**
  Lesley Taylor
- [x] **OES (Office of Emergency Services)**
  Monique Wilber
- [ ] **Food & Agriculture**
  Sandra Schubert
  Dept. of Food and Agriculture
- [ ] **Dept. of General Services**
  Cathy Buck
  Environmental Services Section
- [x] **Housing & Comm. Dev.**
  CEQA Coordinator
  Housing Policy Division

Independent Commissions,Boards

- [ ] **Delta Protection Commission**
  Erik Vink
- [ ] **Delta Stewardship Council**
  Anthony Navasero
- [ ] **California Energy Commission**
  Eric Knight
- [x] **Native American Heritage Comm.**
  Debbie Treadway
- [ ] **Public Utilities Commission**
  Supervisor
- [ ] **Santa Monica Bay Restoration**
  Guangyu Wang
- [x] **State Lands Commission**
  Jennifer Deleong
- [ ] **Tahoe Regional Planning Agency (TRPA)**
  Cherry Jacques

Cal State Transportation Agency CalSTA

- [x] **Caltrans - Division of Aeronautics**
  Philip Crimmins
- [ ] **Caltrans – Planning HQ LD-IGR**
  Christian Bushong
- [x] **California Highway Patrol**
  Suzann Ikeuchi
  Office of Special Projects

Dept. of Transportation

- [ ] **Caltrans, District 1**
  Rex Jackman
- [ ] **Caltrans, District 2**
  Marcelino Gonzalez
- [ ] **Caltrans, District 3**
  Susan Zanchi
- [ ] **Caltrans, District 4**
  Patricia Maurice
- [ ] **Caltrans, District 5**
  Larry Newland
- [ ] **Caltrans, District 6**
  Michael Navarro
- [ ] **Caltrans, District 7**
  Dianna Watson
- [x] **Caltrans, District 8**
  Mark Roberts
- [ ] **Caltrans, District 9**
  Gayle Rosander
- [ ] **Caltrans, District 10**
  Tom Dumas
- [ ] **Caltrans, District 11**
  Jacob Armstrong
- [ ] **Caltrans, District 12**
  Maureen El Harake

Cal EPA

Air Resources Board

- [ ] **Airport & Freight**
  Jack Wursten
  - [ ] **Transportation Projects**
    Nesamani Kalandiyur
  - [ ] **Industrial/Energy Projects**
    Mike Tollstrup
- [ ] **California Department of Resources, Recycling & Recovery**
  Kevin Taylor/Jeff Esquivel
- [ ] **State Water Resources Control Board**
  Regional Programs Unit
  Division of Financial Assistance
- [x] **State Water Resources Control Board**
  Cindy Forbes – Asst Deputy
  Division of Drinking Water
- [ ] **State Water Resources Control Board**
  Div. Drinking Water #_____
- [ ] **State Water Resources Control Board**
  Student Intern, 401 Water Quality Certification Unit
  Division of Water Quality
- [ ] **State Water Resouces Control Board**
  Phil Crader
  Division of Water Rights
- [x] **Dept. of Toxic Substances Control Reg. #_____**
  CEQA Tracking Center
- [ ] **Department of Pesticide Regulation**
  CEQA Coordinator

Regional Water Quality Control Board (RWQCB)

- [ ] **RWQCB 1**
  Cathleen Hudson
  North Coast Region (1)
- [ ] **RWQCB 2**
  Environmental Document Coordinator
  San Francisco Bay Region (2)
- [ ] **RWQCB 3**
  Central Coast Region (3)
- [ ] **RWQCB 4**
  Teresa Rodgers
  Los Angeles Region (4)
- [ ] **RWQCB 5S**
  Central Valley Region (5)
  - [ ] **RWQCB 5F**
    Central Valley Region (5)
    Fresno Branch Office
  - [ ] **RWQCB 5R**
    Central Valley Region (5)
    Redding Branch Office
- [ ] **RWQCB 6**
  Lahontan Region (6)
  - [ ] **RWQCB 6V**
    Lahontan Region (6)
    Victorville Branch Office
- [ ] **RWQCB 7**
  Colorado River Basin Region (7)
- [ ] **RWQCB 8**
  Santa Ana Region (8)
- [x] **RWQCB 9**
  San Diego Region (9)

- [ ] **Other** _____
  _____
  _____
- [ ] _____
  Conservancy

Last Updated 5/22/18

APPENDIX B
NOTICE OF PREPARATION COMMENTS

From: Ramaiya, Jarrett <jramaiya@MurrietaCA.gov>
Sent: Thursday, February 28, 2019 4:48 PM
To: Danny Serrano
Subject: FW: NOP for General Plan Update and Draft SEIR

Hi Danny – public comment from EHL:

Please note that email correspondence with the City of Murrieta, along with attachments, may be subject to the California Public Records Act, and therefore may be subject to disclosure unless otherwise exempt. The City of Murrieta shall not be responsible for any claims, losses or damages resulting from the use of digital data that may be contained in this email.

From: Dan Silver [mailto:dsilverla@me.com]
Sent: Thursday, February 28, 2019 3:29 PM
To: Ramaiya, Jarrett
Subject: NOP for General Plan Update and Draft SEIR

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Mr Ramaiya:

Endangered Habitats League (EHL) is in receipt of the NOP for the project and requests to be maintained on all notification and distribution lists, including for CEQA documents and public hearings. We note that the project includes an update to the Climate Action Plan.

EHL has the following initial comments:

1) Alternatives should include a land use scenario that identifies and increases density in "town centers." Such locations should have enhanced walkability and transit adaptability compared to the automobile centric pattern of growth that it otherwise prevalent in Murrieta.

2) The update should improve the regional jobs-housing imbalance with more employment-generating uses.

2) High quality natural open space should be protected with rural densities of 1 unit per 10 to 20 acres, and preferably low density. Mandatory clustering to achieve a minimum of 75% open space should be applied in these locations.

3) Reflecting its participation in the Western Riverside County Multiple Species Habitat Conservation Program (MSHCP) which reconciles biological and economic objectives on a regional basis, MSHCP compliance should - if not already – *be incorporated into the General Plan* as a mitigation measure for all new development (residential, commercial, industrial, public and private infrastructure). Parenthetically, we note that the residents of Murrieta have been chief beneficiaries of nearby MSHCP financial investments, such as Winchester 700 and Warm Springs Ranch.

4) A revised CAP should focus on the land use and transportation sectors, with reduction of vehicle miles traveled (VMT) as the primary consideration. The California Air Resources Board (CARB) has definitively identified the State's increasing VMT as the greatest obstacle to meeting its greenhouse gas reduction objectives, yet this sector is under local rather than state control. The town center and jobs-housing approaches described above can help, as could a shuttle bus system. In addition, the City should create a program to "retire" the existing development rights for high-VMT housing units that are already approved and which have a high likelihood of actually being constructed. The "avoided conversion" methodology that CARB has developed for agriculture lands should be adapted by the City for this purpose, so as to create carbon credits on lands slated for VMT retirement. These credits would be purchased as GHG mitigation by other development. Retired VMTs could also originate in the unincorporated area. Lands that would contribute to MSHCP assembly should be prioritized, in order to achieve that important co-benefit.

See:

http://sgc.ca.gov/programs/salc/

https://www.arb.ca.gov/cc/capandtrade/auctionproceeds/final_sgc_salc_qm_16-18.pdf

Thank you for considering our input into this Update, and I would be happy to discuss anything further.

With best regards,
Dan

Dan Silver, Executive Director
Endangered Habitats League
8424 Santa Monica Blvd., Suite A 592
Los Angeles, CA 90069-4267

213-804-2750
dsilverla@me.com
www.ehleague.org

From: Ramaiya, Jarrett <jramaiya@MurrietaCA.gov>
Sent: Monday, March 4, 2019 4:39 PM
To: Danny Serrano
Subject: FW: Murrieta General Plan Update - Planning Area 1 - APN: 910-150-024

Importance: High

Just FYI

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From: Brian Bush [mailto:BBush@diversifiedpacific.com]
Sent: Monday, March 04, 2019 4:15 PM
To: Ramaiya, Jarrett
Subject: Murrieta General Plan Update - Planning Area 1 - APN: 910-150-024
Importance: High

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Jarrett,

I'm inquiring about the recent General Plan Update. Could you please provide the description of the Innovation use being proposed for Planning Area 1? Also, all of the uses allowed within? Diversified Pacific owns approximately 1.06 acres, specifically known as APN: 910-150-024, within Planning Area 1. I would like to see how this will impact our property.

Thank you,

Brian A. Bush
Director of Acquisitions
10621 Civic Center Drive
Rancho Cucamonga, CA 91730
Mobile/909-731-2036
Direct/909-373-2629
Main/909-481-1150 ext. 259
Fax/909-481-1151 direct
bbush@diversifiedpacific.com

DIVERSIFIEDPACIFIC
COMMUNITIES

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From: Ramaiya, Jarrett <jramaiya@MurrietaCA.gov>
Sent: Tuesday, March 5, 2019 10:18 AM
To: Danny Serrano
Subject: FW: City's General Plan Update transmittal ALUC comments
Attachments: General Plan Update transmittal ALUC comments.doc

FYI

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From: Rull, Paul [mailto:PRull@RIVCO.ORG]
Sent: Tuesday, March 05, 2019 9:45 AM
To: Ramaiya, Jarrett
Subject: City's General Plan Update transmittal ALUC comments

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Good Morning Jarrett,

Thank you for transmitting the above reference project to ALUC for review. Please find attached my comments. The proposed General Plan focused update (which would be effective City-wide) would impact properties within several Compatibility Zones in French Valley Airport Influence Area. Public Utilities Code Section 21676 requires that General Plan Amendments be submitted to ALUC for review and consistency with the French Valley Airport Land Use Compatibility Plan, as amended in 2011.

If you have any questions, please feel free to contact me.

Paul Rull
ALUC Principal Planner

Riverside County Airport Land Use Commission
4080 Lemon Street, 14th Floor
Riverside, Ca 92501
(951) 955-6893
(951) 955-5177 (fax)
PRULL@RIVCO.ORG
www.rcaluc.org

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County of Riverside California

From: Ramaiya, Jarrett <jramaiya@MurrietaCA.gov>
Sent: Thursday, March 14, 2019 12:44 PM
To: Danny Serrano
Subject: FW: General Plan Update / Scoping Session / Commenting Period

Danny

Just FYI – I'll let her know we're still taking in comments. Is there a technical 'closing' date?

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From: Joshlynn Russell [mailto:joshlynn.russell@gmail.com]
Sent: Thursday, March 14, 2019 12:38 PM
To: Ramaiya, Jarrett
Subject: General Plan Update / Scoping Session / Commenting Period

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Hi Jarrett,

I am a resident of Greer Ranch and want to stay in the loop on the General Plan Update efforts. Unfortunately I was out of town in November and December for the initial events and not available for the upcoming scoping session on March 16th. I do look forward to providing comments on the draft plan, SEIR and climate action plan though.

Upon review of the website and materials I was not able to confirm when your commenting period is closed. Could you please confirm this date and your preferred method of submitting comments?

Thank you,

Joshlynn Russell
760-415-8012

From: Ramaiya, Jarrett <jramaiya@MurrietaCA.gov>
Sent: Monday, March 25, 2019 4:03 PM
To: Danny Serrano
Cc: Stiehl, Carl
Subject: FW: Specific Plan 382 - Notice of Public Hearing/Intent to Certify an EIR
Attachments: Murrietta NOP 2019.pdf

Importance: High

Danny

Comments from Metro Water District (they called us last Thursday to state that they would submit comments by today).

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From: Marks,Alexander S [mailto:AMarks@mwdh2o.com]
Sent: Monday, March 25, 2019 3:59 PM
To: Ramaiya, Jarrett
Cc: Abeles, Lorie
Subject: RE: Specific Plan 382 - Notice of Public Hearing/Intent to Certify an EIR
Importance: High

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Mr. Ramaiya -

Please find the Metropolitan Water District of Southern California's comment letter on the subject Notice of Preparation of General Plan Update and a Draft Supplemental Environmental Impact Report attached.

Please contact me if you have any questions.

Sincerely,
Alex Marks

Alex Marks, AICP
Environmental Specialist
The Metropolitan Water District
(213) 217-7629

EPS ENVIRONMENTAL PLANNING SECTION

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From: Ramaiya, Jarrett <jramaiya@MurrietaCA.gov>
Sent: Tuesday, March 26, 2019 4:11 PM
To: Danny Serrano
Cc: Stiehl, Carl
Subject: FW: Specific Plan 382 - Notice of Public Hearing/Intent to Certify an EIR
Attachments: Substructures Guidelines-Final - July 18 Publication.pdf

Danny

Good catch on that comment letter from MWD of SoCal – their staff provided the second attachment to the letter and is attached

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From: Marks,Alexander S [mailto:AMarks@mwdh2o.com]
Sent: Tuesday, March 26, 2019 4:02 PM
To: Ramaiya, Jarrett
Subject: RE: Specific Plan 382 - Notice of Public Hearing/Intent to Certify an EIR

Hi Jarrett –

My apologies for leaving it out. Please see attached.

Best

Alex Marks, AICP
Environmental Specialist
The Metropolitan Water District
(213) 217-7629

EPS ENVIRONMENTAL PLANNING SECTION

From: Marks,Alexander S [mailto:AMarks@mwdh2o.com]
Sent: Monday, March 25, 2019 3:59 PM
To: Ramaiya, Jarrett
Cc: Abeles, Lorie
Subject: RE: Specific Plan 382 - Notice of Public Hearing/Intent to Certify an EIR
Importance: High

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Mr. Ramaiya -

Please find the Metropolitan Water District of Southern California's comment letter on the subject Notice of Preparation of General Plan Update and a Draft Supplemental Environmental Impact Report attached.

Please contact me if you have any questions.

Sincerely,
Alex Marks

Alex Marks, AICP
Environmental Specialist
The Metropolitan Water District
(213) 217-7629

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RIVERSIDE COUNTY
DEPARTMENT OF
WASTE RESOURCES

Hans W. Kernkamp, General Manager-Chief Engineer

March 14, 2019

RECEIVED

MAR 19 2019

CITY OF MURRIETA
DEVELOPMENT SERVICES DEPT
PLANNING DIVISION

Mr. Jarrett Ramaiya
City Planner
City of Murrieta
1 Town Square
Murrieta, CA 92562

RE: Notice of Preparation (NOP) of a Draft Supplemental Environmental Impact Report (SEIR) for the City of Murrieta General Plan Update (Project)

Dear Mr. Ramaiya:

The Riverside County Department of Waste Resources (RCDWR) has reviewed the NOP addressing a Draft SEIR for the City of Murrieta's General Plan Update. The Draft SEIR will address the potential impacts associated with the proposed General Plan update.

1. Build-out of the Project may have the potential to increase the amount of waste that could adversely affect solid waste facilities. To assess waste impacts, the Draft SEIR should include the projected maximum amount of waste generated from build-out of the Project, using appropriate waste generation factors for the proposed General Plan update land uses.

   Note- CalRecycle's website may be helpful to determine the Project's waste generation: https://www2.calrecycle.ca.gov/WasteCharacterization/General/Rates

2. The following information can be useful in the analysis of the solid waste impacts:

   a) Solid waste generated within the Project area is collected by Waste Management Inc. (WMI), with the bulk of recyclable waste and green waste delivered to the Moreno Valley Solid Waste Recycling and Transfer Facility (MVTS) for processing. The MVTS is located at 17700 Indian Street in Moreno Valley. It is permitted for a 2,500-tpd operation.

   b) While the El Sobrante landfill is the closest landfill to the Project site, the franchise waste hauler could also use the Lamb Canyon and Badlands landfills for disposal of the waste generated from the proposed Project. Descriptions of the local landfills are provided below:

   <u>El Sobrante Landfill:</u>

   The El Sobrante Landfill is located east of Interstate 15 and Temescal Canyon Road to the south of the City of Corona and Cajalco Road at 10910 Dawson Canyon Road. The landfill

is owned and operated by USA Waste of California, a subsidiary of Waste Management, Inc., and encompasses 1,322 acres, of which 645 acres are permitted for landfill operation. The El Sobrante Landfill has a total disposal capacity of approximately 209.9 million cubic yards and can receive up to 70,000 tons per week (tpw) of refuse.
USA Waste must allot at least 28,000 tpw for County refuse. The landfill's permit allows a maximum of 16,054 tons per day (tpd) of waste to be accepted into the landfill, due to the limits on vehicle trips. If needed, 5,000 tpd must be reserved for County waste, leaving the maximum commitment of Non-County waste at 11,054 tpd. Per the 2017 Annual Report, the landfill had a remaining in-County disposal capacity of approximately 55.1 million tons.[1] In 2017, the El Sobrante Landfill accepted a daily average of 10,607 tons with a period total of approximately 3,256,432 tons. The landfill is expected to reach capacity in approximately 2060.

Lamb Canyon Landfill:

The Lamb Canyon Landfill is located between the City of Beaumont and City of San Jacinto at 16411 Lamb Canyon Road (State Route 79), south of Interstate 10 and north of Highway 74. The landfill is owned and operated by Riverside County. The landfill property encompasses approximately 1,189 acres, of which 703.4 acres encompass the current landfill permit area. Of the 703.4-acre landfill permit area, approximately 144.6 acres are permitted for waste disposal. The landfill is currently permitted to receive 5,000 tpd of MSW for disposal and 500 tpd for beneficial reuse. The site has an estimated total disposal capacity of approximately 20.7 million tons. As of January 1, 2019 (beginning of day), the landfill has a total remaining capacity of approximately 9.3 million tons . The current landfill remaining disposal capacity is estimated to last, at a minimum, until approximately 2029. From January 2018 to December 2018, the Lamb Canyon Landfill accepted a daily average of 1,944 tons with a period total of approximately 596,863 tons. Landfill expansion potential exists at the Lamb Canyon Landfill site.

Badlands Landfill:

The Badlands Landfill is located northeast of the City of Moreno Valley at 31125 Ironwood Avenue and accessed from State Highway 60 at Theodore Avenue. The landfill is owned and operated by Riverside County. The existing landfill encompasses 1,168.3 acres, with a total permitted disturbance area of 278 acres, of which 150 acres are permitted for refuse disposal. The landfill is currently permitted to receive 4,500 tpd of MSW for disposal and 300 tpd for beneficial reuse. The site has an estimated total capacity of approximately 20.5 million tons. As of January 1, 2019 (beginning of day), the landfill had a total remaining disposal capacity of approximately 6 million tons. The current landfill remaining disposal capacity is estimated to last, at a minimum, until approximately 2022. From January 2018 to December 2018, the Badlands Landfill accepted a daily average of 2,909 tons with a period total of approximately 893,016 tons. Landfill expansion potential exists at the Badlands Landfill site.

---

[1] 2017 El Sobrante Landfill Annual Report- Based on 137,936,464 tons remaining capacity (40% for in-county waste).

3. Additionally, you may wish to consider incorporating the following measures to help reduce the Project's anticipated solid waste impacts and enhance efforts to comply with the State's mandate of 50% solid waste diversion from landfilling:

   - The use of mulch and/or compost in the development and maintenance of landscaped areas within the project boundaries is recommended. Recycle green waste through either onsite composting of grass, i.e., leaving the grass clippings on the lawn, or sending separated green waste to a composting facility.

   - Consider xeriscaping and the use of drought tolerant low maintenance vegetation in all landscaped areas of the project.

   - Hazardous materials are not accepted at the Riverside County landfills. Any hazardous wastes, including paint, used during construction must be properly disposed of at a licensed facility in accordance with local, state and federal regulations. For further information regarding the determination, transport, and disposal of hazardous waste, please contact the Riverside County Department of Health, Environmental Protection and Oversight Division, at 1.888.722.4234.

   - AB 341 focuses on increased commercial waste recycling as a method to reduce greenhouse gas (GHG) emissions. The regulation requires businesses and organizations that generate four or more cubic yards of waste per week and multifamily units of 5 or more, to recycle. A business shall take at least one of the following actions in order to reuse, recycle, compost, or otherwise divert commercial solid waste from disposal:

     - Source separate recyclable and/or compostable material from solid waste and donate or self-haul the material to recycling facilities.

     - Subscribe to a recycling service with waste hauler.

     - Provide recycling service to tenants (if commercial or multi-family complex).

     - Demonstrate compliance with requirements of California Code of Regulations Title 14.

     - For more information, please visit: http://www.rcwaste.org/business/recycling/mcr

   - AB 1826 requires businesses that generate 8 cubic yards or more of organic waste per week to arrange for organic waste recycling services. The threshold amount of organic waste generated requiring compliance by businesses is reduced in subsequent years. Businesses subject to AB 1826 shall take at least one of the following actions in order to divert organic waste from disposal:

- Source separate organic material from all other recyclables and donate or self-haul to a permitted organic waste processing facility.

- Enter into a contract or work agreement with gardening or landscaping service provider or refuse hauler to ensure the waste generated from those services meet the requirements of AB 1826.

4. The Draft SEIR should provide a discussion about the need for the Project to comply with all regulatory requirements regarding recycling access in accordance with SB 1327, Chapter 18, California Solid Waste Reuse and Recycling Access Act of 1991.

Thank you for allowing us the opportunity to comment on the NOP. We would appreciate a copy of the Draft SEIR on CD for review and comment when available. Please continue to include the RCDWR in future transmittals. Please call me at (951) 486-3200 if you have any questions regarding the above comments.

Sincerely,

Jose Merlan
Urban/Regional Planner III

PD# 236979

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 • www.aqmd.gov

SENT VIA USPS AND E-MAIL: March 12, 2019
jramaiya@MurrietaCA.gov
Jarret Ramaiya, City Planner
City of Murrieta, Planning Department
1 Town Square
Murrieta, CA 92562

Notice of Preparation of a Draft Supplemental Environmental Impact Report for the Proposed Murrieta General Plan Update and Draft Supplemental Environmental Impact Report

South Coast Air Quality Management District (SCAQMD) staff appreciates the opportunity to comment on the above-mentioned document. SCAQMD staff's comments are recommendations regarding the analysis of potential air quality impacts from the Proposed Project that should be included in the Draft Supplemental Environmental Impact Report (SEIR). Please send SCAQMD a copy of the Draft SEIR upon its completion. Note that copies of the Draft SEIR that are submitted to the State Clearinghouse are not forwarded to SCAQMD. Please forward a copy of the Draft SEIR directly to SCAQMD at the address shown in the letterhead. **In addition, please send with the Draft SEIR all appendices or technical documents related to the air quality, health risk, and greenhouse gas analyses and electronic versions of all air quality modeling and health risk assessment files[1]. These include emission calculation spreadsheets and modeling input and output files (not PDF files). Without all files and supporting documentation, SCAQMD staff will be unable to complete our review of the air quality analyses in a timely manner. Any delays in providing all supporting documentation will require additional time for review beyond the end of the comment period.**

Air Quality Analysis

SCAQMD adopted its California Environmental Quality Act (CEQA) Air Quality Handbook in 1993 to assist other public agencies with the preparation of air quality analyses. SCAQMD staff recommends that the Lead Agency use this Handbook as guidance when preparing its air quality analyses. Copies of the Handbook are available from the SCAQMD's Subscription Services Department by calling (909) 396-3720. More recent guidance developed since this Handbook was published is also available on SCAQMD's website at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/ceqa-air-quality-handbook-(1993). SCAQMD staff also recommends that the Lead Agency use the CalEEMod land use emissions software. This software has recently been updated to incorporate up-to-date state and locally approved emission factors and methodologies for estimating pollutant emissions from typical land use development. CalEEMod is the only software model maintained by the California Air Pollution Control Officers Association (CAPCOA) and replaces the now outdated URBEMIS. This model is available free of charge at: www.caleemod.com.

On March 3, 2017, the SCAQMD's Governing Board adopted the 2016 Air Quality Management Plan (2016 AQMP), which was later approved by the California Air Resources Board on March 23, 2017.

[1] Pursuant to the CEQA Guidelines Section 15174, the information contained in an EIR shall include summarized technical data, maps, plot plans, diagrams, and similar relevant information sufficient to permit full assessment of significant environmental impacts by reviewing agencies and members of the public. Placement of highly technical and specialized analysis and data in the body of an EIR should be avoided through inclusion of supporting information and analyses as appendices to the main body of the EIR. Appendices to the EIR may be prepared in volumes separate from the basic EIR document, but shall be readily available for public examination and shall be submitted to all clearinghouses which assist in public review.

Built upon the progress in implementing the 2007 and 2012 AQMPs, the 2016 AQMP provides a regional perspective on air quality and the challenges facing the South Coast Air Basin. The most significant air quality challenge in the Basin is to achieve an additional 45 percent reduction in nitrogen oxide (NOx) emissions in 2023 and an additional 55 percent NOx reduction beyond 2031 levels for ozone attainment. The 2016 AQMP is available on SCAQMD's website at: http://www.aqmd.gov/home/library/clean-air-plans/air-quality-mgt-plan.

SCAQMD staff recognizes that there are many factors Lead Agencies must consider when making local planning and land use decisions. To facilitate stronger collaboration between Lead Agencies and SCAQMD to reduce community exposure to source-specific and cumulative air pollution impacts, SCAQMD adopted the Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning in 2005. This Guidance Document provides suggested policies that local governments can use in their General Plans or through local planning to prevent or reduce potential air pollution impacts and protect public health. SCAQMD staff recommends that the Lead Agency review this Guidance Document as a tool when making local planning and land use decisions. This Guidance Document is available on SCAQMD's website at: http://www.aqmd.gov/docs/default-source/planning/air-quality-guidance/complete-guidance-document.pdf. Additional guidance on siting incompatible land uses (such as placing homes near freeways or other polluting sources) can be found in the California Air Resources Board's *Air Quality and Land Use Handbook: A Community Health Perspective*, which can be found at: http://www.arb.ca.gov/ch/handbook.pdf. Guidance[2] on strategies to reduce air pollution exposure near high-volume roadways can be found at: https://www.arb.ca.gov/ch/rd_technical_advisory_final.PDF.

SCAQMD has also developed both regional and localized air quality significance thresholds. SCAQMD staff requests that the Lead Agency compare the emissions to the recommended regional significance thresholds found here: http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf. In addition to analyzing regional air quality impacts, SCAQMD staff recommends calculating localized air quality impacts and comparing the results to localized significance thresholds (LSTs). LSTs can be used in addition to the recommended regional significance thresholds as a second indication of air quality impacts when preparing a CEQA document. Therefore, when preparing the air quality analysis for the Proposed Project, it is recommended that the Lead Agency perform a localized analysis by either using the LSTs developed by SCAQMD or performing dispersion modeling as necessary. Guidance for performing a localized air quality analysis can be found at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/localized-significance-thresholds.

When specific development is reasonably foreseeable as result of the goals, policies, and guidelines in the Proposed Project, the Lead Agency should identify any potential adverse air quality impacts and sources of air pollution that could occur using its best efforts to find out and a good-faith effort at full disclosure in the Draft SEIR. The degree of specificity will correspond to the degree of specificity involved in the underlying activity which is described in the Draft SEIR (CEQA Guidelines Section 15146). When quantifying air quality emissions, emissions from both construction (including demolition, if any) and operations should be calculated. Construction-related air quality impacts typically include, but are not limited to, emissions from the use of heavy-duty equipment from grading, earth-loading/unloading, paving, architectural coatings, off-road mobile sources (e.g., heavy-duty construction equipment) and on-road mobile sources (e.g., construction worker vehicle trips, material transport trips). Operation-related air quality impacts may include, but are not limited to, emissions from stationary sources (e.g., boilers),

[2] In April 2017, CARB published a technical advisory, *Strategies to Reduce Air Pollution Exposure Near High-Volume Roadways: Technical Advisory*, to supplement CARB's Air Quality and Land Use Handbook: A Community Health Perspective. This technical advisory is intended to provide information on strategies to reduce exposures to traffic emissions near high-volume roadways to assist land use planning and decision-making in order to protect public health and promote equity and environmental justice. The technical advisory is available at: https://www.arb.ca.gov/ch/landuse.htm.

area sources (e.g., solvents and coatings), and vehicular trips (e.g., on- and off-road tailpipe emissions and entrained dust). Air quality impacts from indirect sources, such as sources that generate or attract vehicular trips, should be included in the analysis. Furthermore, for phased projects where there will be an overlap between construction and operation, the emissions from the overlapping construction and operational activities should be combined and compared to SCAQMD's regional air quality CEQA *operational* thresholds to determine the level of significance.

In the event that the Proposed Project generates or attracts vehicular trips, especially heavy-duty diesel-fueled vehicles, it is recommended that the Lead Agency perform a mobile source health risk assessment. Guidance for performing a mobile source health risk assessment ("*Health Risk Assessment Guidance for Analyzing Cancer Risk from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis*") can be found at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/mobile-source-toxics-analysis. An analysis of all toxic air contaminant impacts due to the use of equipment potentially generating such air pollutants should also be included.

Mitigation Measures and Health Risks Reduction Strategies

In the event that the Proposed Project generates significant adverse air quality impacts, CEQA requires that all feasible mitigation measures that go beyond what is required by law be utilized during project construction and operation to minimize or eliminate these impacts. Pursuant to CEQA Guidelines Section 15126.4 (a)(1)(D), any impacts resulting from mitigation measures must also be discussed. Several resources are available to assist the Lead Agency with identifying possible mitigation measures for the Proposed Project, including:

- Chapter 11 "Mitigating the Impact of a Project" of SCAQMD's *CEQA Air Quality Handbook*
- SCAQMD's CEQA web pages available here: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies
- SCAQMD's Rule 403 – Fugitive Dust, and the Implementation Handbook for controlling construction-related emissions and Rule 1403 – Asbestos Emissions from Demolition/Renovation Activities
- CAPCOA's *Quantifying Greenhouse Gas Mitigation Measures* available here: http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf

Additional Recommended Mitigation Measures

SCAQMD staff has prepared the following list of mitigation measures as suggestions to the Lead Agency to consider and incorporate in the Draft SEIR.

- Require the use of Tier 4 emissions standards or better for off-road diesel-powered construction equipment of 50 horsepower or greater. To ensure that Tier 4 construction equipment or better will be used during the Proposed Project's construction, SCAQMD staff recommends that the Lead Agency include this requirement in applicable bid documents, purchase orders, and contracts. Successful contractor(s) must demonstrate the ability to supply the compliant construction equipment for use prior to any ground disturbing and construction activities. A copy of each unit's certified tier specification or model year specification and California Air Resources Board (CARB) or SCAQMD operating permit (if applicable) shall be available upon request at the time of mobilization of each applicable unit of equipment. Additionally, the Lead Agency should require periodic reporting and provision of written construction documents by construction contractor(s) to ensure compliance, and conduct regular inspections to the maximum extent feasible to ensure compliance.
- Require zero-emissions or near-zero emission on-road haul trucks such as heavy-duty trucks with natural gas engines that meet the CARB's adopted optional NOx emissions standard at 0.02

grams per brake horsepower-hour (g/bhp-hr), if and when feasible. At a minimum, require that construction vendors, contractors, and/or haul truck operators commit to using 2010 model year trucks (e.g., material delivery trucks and soil import/export) that meet CARB's 2010 engine emissions standards at 0.01 g/bhp-hr of particulate matter (PM) and 0.20 g/bhp-hr of NOx emissions or newer, cleaner trucks[3]. The Lead Agency should include this requirement in applicable bid documents, purchase orders, and contracts. Operators shall maintain records of all trucks associated with project construction to document that each truck used meets these emission standards, and make the records available for inspection. The Lead Agency should conduct regular inspections to the maximum extent feasible to ensure compliance.

- Suspend all on-site construction activities when wind speeds (as instantaneous gusts) exceed 25 miles per hour.
- All trucks hauling dirt, sand, soil or other loose materials are to be covered, or should maintain at least two feet of freeboard in accordance with California Vehicle Code Section 23114 (freeboard means vertical space between the top of the load and top of the trailer).
- Enter into applicable bid documents, purchase orders, and contracts to notify all construction vendors, contractors, and/or haul truck operators that vehicle and construction equipment idling time will be limited to no longer than five minutes, consistent with the CARB's policy[4]. For any idling that is expected to take longer than five minutes, the engine should be shut off. Notify construction vendors, contractors, and/or haul truck operators of these idling requirements at the time that the purchase order is issued and again when vehicles enter the Proposed Project site. To further ensure that drivers understand the vehicle idling requirement, post signs at the Proposed Project site, where appropriate, stating that idling longer than five minutes is not permitted.
- Have truck routes clearly marked with trailblazer signs, so that trucks will not enter residential areas.
- Limit the daily number of trucks allowed at the Proposed Project to levels analyzed in the CEQA document. If higher daily truck volumes are anticipated to visit the site, the Lead Agency should commit to re-evaluating the Proposed Project through the CEQA process prior to allowing this land use or higher activity level.
- Provide electric vehicle (EV) Charging Stations (see the discussion below regarding EV charging stations).
- Should the Proposed Project generate significant regional emissions, the Lead Agency should require mitigation that requires accelerated phase-in for non-diesel powered trucks. For example, natural gas trucks, including Class 8 HHD trucks, are commercially available today. Natural gas trucks can provide a substantial reduction in health risks, and may be more financially feasible today due to reduced fuel costs compared to diesel. In the Draft SEIR, the Lead Agency should require a phase-in schedule for these cleaner operating trucks to reduce any significant adverse air quality impacts. SCAQMD staff is available to discuss the availability of current and upcoming truck technologies and incentive programs with the Lead Agency.
- Trucks that can operate at least partially on electricity have the ability to substantially reduce the significant NOx impacts from this project. Further, trucks that run at least partially on electricity are projected to become available during the life of the project as discussed in the 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy (2016-2040 RTP/SCS)[5]. It is important to make this electrical infrastructure available when the project is built so that it is

[3] Based on a review of the California Air Resources Board's diesel truck regulations, 2010 model year diesel haul trucks should have already been available and can be obtained in a successful manner for the project construction California Air Resources Board. March 2016. Available at: http://www.truckload.org/tca/files/ccLibraryFiles/Filename/000000003422/California-Clean-Truck-and-Trailer-Update.pdf (See slide #23).

[4] California Air Resources Board. June 2009. *Written Idling Policy Guidelines*. Accessed at: https://www.arb.ca.gov/msprog/ordiesel/guidance/writtenidlingguide.pdf.

[5] Southern California Association of Governments. Accessed at: http://scagrtpscs.net/Pages/FINAL2016RTPSCS.aspx.

ready when this technology becomes commercially available. The cost of installing electrical charging equipment onsite is significantly cheaper if completed when the project is built compared to retrofitting an existing building. Therefore, SCAQMD staff recommends the Lead Agency require the Proposed Project and other plan areas that allow truck parking to be constructed with the appropriate infrastructure to facilitate sufficient electric charging for trucks to plug-in. Similar to the City of Los Angeles requirements for all new projects, SCAQMD staff recommends that the Lead Agency require at least 5% of all vehicle parking spaces (including for trucks) include EV charging stations[6]. Further, electrical hookups should be provided at the onsite truck stop for truckers to plug in any onboard auxiliary equipment. At a minimum, electrical panels should be appropriately sized to allow for future expanded use.

- Design warehouses or distribution centers such that entrances and exits are such that trucks are not traversing past neighbors or other sensitive receptors.
- Design warehouses or distribution centers such that any check-in point for trucks is well inside the site to ensure that there are no trucks queuing outside of the facility.
- Design warehouses or distribution centers to ensure that truck traffic within the site is located away from the property line(s) closest to its residential or sensitive receptor neighbors.
- Restrict overnight parking in residential areas.
- Establish overnight parking within warehouses or distribution centers where trucks can rest overnight.
- Establish area(s) within warehouses or distribution centers for repair needs.
- Develop, adopt and enforce truck routes to and from warehouses or distribution centers that avoid sensitive receptors, where feasible.
- Create a buffer zone of at least 300 meters (roughly 1,000 feet), which can be office space, employee parking, greenbelt, etc. between warehouses or distribution centers and sensitive receptors.
- Maximize use of solar energy including solar panels; installing the maximum possible number of solar energy arrays on the building roofs and/or on the Proposed Project site to generate solar energy for the facility.
- Maximize the planting of trees in landscaping and parking lots.
- Use light colored paving and roofing materials (e.g., "cool" roofs and cool pavements).
- Utilize only Energy Star heating, cooling, and lighting devices, and appliances.
- Require use of electric or alternatively fueled sweepers with HEPA filters.
- Use of water-based or low VOC cleaning products.

Health Risks Reduction Strategies

Many strategies are available to reduce exposures from locating sensitive land uses near freeways or sources of air pollution, including, but are not limited to, building filtration systems with MERV 13 or better, or in some cases, MERV 15 or better is recommended; building design, orientation, location; vegetation barriers or landscaping screening, etc. Because of the potential adverse health risks involved with siting sensitive receptors near freeways and other sources of air pollution, it is essential that any proposed strategy must be carefully evaluated before implementation.

In the event that enhanced filtration units are required for installation at the Proposed Project either as a mitigation measure or project design feature, SCAQMD staff recommends that the Lead Agency consider the limitations of the enhanced filtration. For example, in a study that SCAQMD conducted to investigate

[6] City of Los Angeles. Accessed at: http://ladbs.org/LADBSWeb/LADBS_Forms/Publications/LAGreenBuildingCodeOrdinance.pdf.

filters[7], a cost burden is expected to be within the range of $120 to $240 per year to replace each filter. The initial start-up cost could substantially increase if an HVAC system needs to be installed. In addition, because the filters would not have any effectiveness unless the HVAC system is running, there may be increased energy costs to the residents. It is typically assumed that the filters operate 100 percent of the time while residents are indoors, and the environmental analysis does not generally account for the times when the residents have their windows or doors open or are in common space areas of the project. In addition, these filters have no ability to filter out any toxic gases from vehicle exhaust. Therefore, the presumed effectiveness and feasibility of any filtration units should be carefully evaluated in more detail prior to assuming that they will sufficiently alleviate exposures to diesel particulate matter (DPM) emissions.

If enhanced filtration units are installed at the Proposed Project, and to ensure that they are enforceable throughout the lifetime of the Proposed Project as well as effective in reducing exposures to DPM emissions, SCAQMD staff recommends that the Lead Agency provide additional details regarding the ongoing, regular maintenance and monitoring of filters in the environmental analysis. To facilitate a good faith effort at full disclosure and provide useful information to future residents who will live at the Proposed Project in a close proximity to freeways and other sources of air pollution, the environmental analysis should include the following information, at a minimum:

- Disclose the potential health impacts to prospective residents from living in a close proximity of freeways and other sources of air pollution and the reduced effectiveness of air filtration system when windows are open and/or when residents are outdoor (e.g., in the common and open space areas);
- Identify the responsible implementing and enforcement agency such as the Lead Agency to ensure that enhanced filtration units are installed on-site at the Proposed Project before a permit of occupancy is issued;
- Identify the responsible implementing and enforcement agency such as the Lead Agency to ensure that enhanced filtration units are inspected regularly;
- Provide information to residents on where the MERV filers can be purchased;
- Disclose the potential increase in energy costs for running the HVAC system to prospective residents;
- Provide recommended schedules (e.g., once a year or every six months) for replacing the enhanced filtration units to prospective residents;
- Identify the responsible entity such as residents themselves, Homeowner's Association, or property management for ensuring enhanced filtration units are replaced on time, if appropriate and feasible (if residents should be responsible for the periodic and regular purchase and replacement of the enhanced filtration units, the Lead Agency should include this information in the disclosure form);
- Identify, provide, and disclose any ongoing cost sharing strategies, if any, for the purchase and replacement of the enhanced filtration units;
- Set City-wide or Project-specific criteria for assessing progress in installing and replacing the enhanced filtration units; and
- Develop a City-wide or Project-specific process for evaluating the effectiveness of the enhanced filtration units at the Proposed Project.

[7] This study evaluated filters rated MERV 13 or better. Accessed at: http://www.aqmd.gov/docs/default-source/ceqa/handbook/aqmdpilotstudyfinalreport.pdf. Also see 2012 Peer Review Journal article by SCAQMD: https://onlinelibrary.wiley.com/doi/10.1111/ina.12013.

Alternatives

In the event that the Proposed Project generates significant adverse air quality impacts, CEQA requires the consideration and discussion of alternatives to the project or its location which are capable of avoiding or substantially lessening any of the significant effects of the project. The discussion of a reasonable range of potentially feasible alternatives, including a "no project" alternative, is intended to foster informed decision-making and public participation. Pursuant to CEQA Guidelines Section 15126.6(d), the Draft SEIR shall include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the Proposed Project.

Permits

In the event that implementation of the Proposed Project requires a permit from SCAQMD, SCAQMD should be identified as a Responsible Agency for the Proposed Project in the Draft SEIR. For more information on permits, please visit SCAQMD's webpage at: http://www.aqmd.gov/home/permits. Questions on permits can be directed to SCAQMD's Engineering and Permitting staff at (909) 396-3385.

Data Sources

SCAQMD rules and relevant air quality reports and data are available by calling the SCAQMD's Public Information Center at (909) 396-2039. Much of the information available through the Public Information Center is also available via the SCAQMD's webpage (http://www.aqmd.gov).

SCAQMD staff is available to work with the Lead Agency to ensure that project air quality impacts are accurately evaluated and mitigated where feasible. Please contact me at (909) 396-3308, should you have any questions.

Sincerely,

Lijin Sun

Lijin Sun, J.D.
Program Supervisor, CEQA IGR
Planning, Rule Development & Area Sources

LS
RVC190301-08
Control Number

NATIVE AMERICAN HERITAGE COMMISSION
Cultural and Environmental Department
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691 Phone (916) 373-3710
Email: nahc@nahc.ca.gov
Website: http://www.nahc.ca.gov
Twitter: @CA_NAHC

RECEIVED
MAR - 8 2019
CITY OF MURRIETA
DEVELOPMENT SERVICES DEPT
PLANNING DIVISION

March 6, 2019

Jarrett Ramaiya
City of Murrieta
1 Town Square
Murrieta, CA 92562

RE: SCH# 2010111084 Murrieta General Plan Update, Riverside County

Dear Ms. Ramaiya:

The Native American Heritage Commission (NAHC) has received the Notice of Preparation (NOP), Draft Environmental Impact Report (DEIR) or Early Consultation for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code §21000 et seq.), specifically Public Resources Code §21084.1, states that a project that may cause a substantial adverse change in the significance of a historical resource, is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, §15064.5 (b) (CEQA Guidelines §15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an Environmental Impact Report (EIR) shall be prepared. (Pub. Resources Code §21080 (d); Cal. Code Regs., tit. 14, § 5064 subd.(a)(1) (CEQA Guidelines §15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources within the area of potential effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a separate category of cultural resources, "tribal cultural resources" (Pub. Resources Code §21074) and provides that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. (Pub. Resources Code §21084.2). Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code §21084.3 (a)). **AB 52 applies to any project for which a notice of preparation, a notice of negative declaration, or a mitigated negative declaration is filed on or after July 1, 2015.** If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). **Both SB 18 and AB 52 have tribal consultation requirements.** If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. §800 et seq.) may also apply.

The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of portions of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments.

Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws.

AB 52

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

1. Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a lead agency shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:
    a. A brief description of the project.
    b. The lead agency contact information.
    c. Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code §21080.3.1 (d)).
    d. A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code §21073).

2. Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code §21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or Environmental Impact Report. (Pub. Resources Code §21080.3.1(b)).
    a. For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code §65352.4 (SB 18). (Pub. Resources Code §21080.3.1 (b)).

3. Mandatory Topics of Consultation If Requested by a Tribe: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:
    a. Alternatives to the project.
    b. Recommended mitigation measures.
    c. Significant effects. (Pub. Resources Code §21080.3.2 (a)).

4. Discretionary Topics of Consultation: The following topics are discretionary topics of consultation:
    a. Type of environmental review necessary.
    b. Significance of the tribal cultural resources.
    c. Significance of the project's impacts on tribal cultural resources.
    d. If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code §21080.3.2 (a)).

5. Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code §6254 (r) and §6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. (Pub. Resources Code §21082.3 (c)(1)).

6. Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:
    a. Whether the proposed project has a significant impact on an identified tribal cultural resource.
    b. Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code §21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code §21082.3 (b)).

7. Conclusion of Consultation: Consultation with a tribe shall be considered concluded when either of the following occurs:
    a. The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or
    b. A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code §21080.3.2 (b)).

8. Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code §21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code §21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code §21082.3 (a)).

9. Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code §21084.3 (b). (Pub. Resources Code §21082.3 (e)).

10. Examples of Mitigation Measures That, If Feasible, May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:
    a. Avoidance and preservation of the resources in place, including, but not limited to:
        i. Planning and construction to avoid the resources and protect the cultural and natural context.
        ii. Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.
    b. Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:
        i. Protecting the cultural character and integrity of the resource.
        ii. Protecting the traditional use of the resource.
        iii. Protecting the confidentiality of the resource.
    c. Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.
    d. Protecting the resource. (Pub. Resource Code §21084.3 (b)).
    e. Please note that a federally recognized California Native American tribe or a non-federally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code §815.3 (c)).
    f. Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code §5097.991).

11. Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource: An Environmental Impact Report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:
    a. The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code §21080.3.1 and §21080.3.2 and concluded pursuant to Public Resources Code §21080.3.2.
    b. The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.
    c. The lead agency provided notice of the project to the tribe in compliance with Public Resources Code §21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code §21082.3 (d)).

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf

SB 18

SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. (Gov. Code §65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf

Some of SB 18's provisions include:

1. Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.** (Gov. Code §65352.3 (a)(2)).
2. No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.
3. Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code §65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code §5097.9 and §5097.993 that are within the city's or county's jurisdiction. (Gov. Code §65352.3 (b)).
4. Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:
    a. The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
    b. Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (http://ohp.parks.ca.gov/?page_id=1068) for an archaeological records search. The records search will determine:
    a. If part or all of the APE has been previously surveyed for cultural resources.
    b. If any known cultural resources have already been recorded on or adjacent to the APE.
    c. If the probability is low, moderate, or high that cultural resources are located in the APE.
    d. If a survey is required to determine whether previously unrecorded cultural resources are present.

2. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
    a. The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.
    b. The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

3. Contact the NAHC for:
   a. A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.
   b. A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.

4. Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.
   a. Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, §15064.5(f) (CEQA Guidelines §15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.
   b. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.
   c. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code §7050.5, Public Resources Code §5097.98, and Cal. Code Regs., tit. 14, §15064.5, subdivisions (d) and (e) (CEQA Guidelines §15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

If you have any questions or need additional information, please contact me at my email address: Steven.Quinn@nahc.ca.gov.

Sincerely,

Nancy Gamez

for Steven Quinn
Associate Governmental Program Analyst

cc: State Clearinghouse

APPENDIX C
DRAFT TECHNICAL MEMORANDUM: AIR QUALITY AND GREENHOUSE GAS IMPACT ANALYSIS

Memo

1230 Columbia Street, Suite 440
San Diego, CA 92101
619.219-8000

Date: February 14, 2020
To: Brian Mooney, RICK Engineering
From: Alyssa Way, Poonam Boparai, and Andrew Martin
Subject: City of Murrieta General Plan Update
Revised Draft Technical Memorandum: Air Quality and Greenhouse Gas Impact Analysis

ORGANIZATION OF THIS MEMORANDUM

This memorandum consists of four main sections:

- Section 1: Introduction
- Section 2: Project Description
- Section 3: Air Quality Analysis
- Section 4: Greenhouse Gas (GHG) Analysis

1 INTRODUCTION

This technical memorandum identifies and analyzes the potential air quality and GHG environmental impacts associated with the City of Murrieta proposed General Plan Update (GPU) and Climate Action Plan Update (CAP Update) (project). The information and analysis in this document are organized in accordance with the checklist in Appendix G of the California Environmental Quality Act (CEQA) Guidelines and current State and local guidance. Information from the City of Murrieta's 2011 General Plan Environmental Impact Report (EIR) are incorporated into this memorandum by reference.

This memorandum includes a discussion of existing air quality conditions and an analysis of potential short-term and long-term air quality impacts that could result from buildout of the GPU. This memorandum also includes State, federal, and local regulations that have been adopted or updated since the 2011 General Plan Environmental Impact Report (EIR) was certified. The method of analysis for short-term construction, long-term regional (operational), local mobile-source, and toxic air emissions is consistent with the recommendations of the U.S. Environmental Protection Agency (EPA), California Air Resources Board (CARB), and South Coast Air Quality Management District (SCAQMD). Additionally, this memorandum includes a discussion of existing GHG conditions and a GHG impact analysis from implementation of the project. The method of analysis for GHG emissions is consistent with recommendations of CARB.

2 PROJECT DESCRIPTION

The City of Murrieta is located in southeastern Riverside County and is comprised of 26,852 acres (41.96 square miles) of which 21,511 acres (33.61 square miles) is located within the City limits and 5,341 acres (8.34 square miles) is located within the City's Sphere of Influence. In 2009, the City of Murrieta initiated a comprehensive update of the General Plan which was adopted on July 19, 2011 and included a Climate

Action Plan. In 2018, the City issued a request for proposals (RFP) to prepare a GPU, a CAP Update and the preparation of a Supplemental Environmental Impact Report (SEIR). The main goals of the GPU include:

- Additions, deletions, or modifications to the 2011 General Plan goals, policies, exhibits and implementation to address changes in State law enacted since the adoption of the 2011 General Plan.
- Update of General Plan development projections to the year 2035.
- Update of the Land Use Element with a new land use designation (Innovation) and a revised mix and location of land use designations in six key areas as shown on General Plan Land Use Policy Map (Exhibit 2-2).
- Elimination of focus areas and incorporation of focus area policies/goals into other sections of the GPU, as appropriate.
- Prepare a CAP Update identifying actions the City will take to achieve its fair share of GHG reductions by 2030 and 2035, consistent with State laws, policy, goals, and the latest climate change science.

With these intended goals the GPU proposes an addition 1,572 dwelling units and reduce 2,405,601 square feet of non-residential land uses from those proposed in the 2011 General Plan.

3 AIR QUALITY

3.1 REGULATORY SETTING

The following State, federal, and local regulations were not provided or have been updated since certification of the 2011 General Plan EIR.

3.1.1 Federal

EPA has been charged with implementing national air quality programs. EPA's air quality mandates are drawn primarily from the federal Clean Air Act (CAA), which was enacted in 1970. The most recent major amendments made by Congress were in 1990.

Criteria Air Pollutants

The CAA required EPA to establish the NAAQS. As shown in Table 1, EPA has established primary and secondary NAAQS for the following criteria air pollutants: ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter with an aerodynamic diameter of 10 microns or less (PM_{10}), particulate matter with an aerodynamic diameter of 2.5 microns or less ($PM_{2.5}$), and lead. The primary standards protect the public health and the secondary standards protect public welfare. The CAA also requires each state to prepare a State Implementation Plan (SIP) for attaining and maintaining the NAAQS. The federal Clean Air Act Amendments of 1990 added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. Individual SIPs are modified periodically to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. EPA is responsible for reviewing all SIPs to determine whether they conform to the mandates of the CAA and its amendments, and whether implementation will achieve air quality goals. If EPA determines a SIP to be inadequate, a federal implementation plan that imposes additional control measures may be prepared for the nonattainment area. If an approvable SIP is not submitted or implemented within the mandated time frame, sanctions may be applied to transportation funding and stationary air pollution sources in the air basin.

Table 1 National and California Ambient Air Quality Standards

Pollutant	Averaging Time	California (CAAQS)[a,b]	National (NAAQS)[c]	
			Primary[b,d]	Secondary[b,e]
Ozone	1-hour	0.09 ppm (180 µg/m^3)	–[e]	Same as primary standard
	8-hour	0.070 ppm (137 µg/m^3)	0.070 ppm (147 µg/m^3)	
Carbon monoxide (CO)	1-hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	Same as primary standard
	8-hour	9 ppm[f] (10 mg/m^3)	9 ppm (10 mg/m^3)	
Nitrogen dioxide (NO_2)	Annual arithmetic mean	0.030 ppm (57 µg/m^3)	53 ppb (100 µg/m^3)	Same as primary standard
	1-hour	0.18 ppm (339 µg/m^3)	100 ppb (188 µg/m^3)	–
Sulfur dioxide (SO_2)	24-hour	0.04 ppm (105 µg/m^3)	–	–
	3-hour	–	–	0.5 ppm (1300 µg/m^3)
	1-hour	0.25 ppm (655 µg/m^3)	75 ppb (196 µg/m^3)	–
Respirable particulate matter (PM_{10})	Annual arithmetic mean	20 µg/m^3	–	Same as primary standard
	24-hour	50 µg/m^3	150 µg/m^3	
Fine particulate matter ($PM_{2.5}$)	Annual arithmetic mean	12 µg/m^3	12.0 µg/m^3	15.0 µg/m^3
	24-hour	–	35 µg/m^3	Same as primary standard
Lead[f]	Calendar quarter	–	1.5 µg/m^3	Same as primary standard
	30-Day average	1.5 µg/m^3	–	–
	Rolling 3-Month Average	–	0.15 µg/m^3	Same as primary standard
Hydrogen sulfide	1-hour	0.03 ppm (42 µg/m^3)	No national standards	
Sulfates	24-hour	25 µg/m^3		
Vinyl chloride[f]	24-hour	0.01 ppm (26 µg/m^3)		
Visibility-reducing particulate matter	8-hour	Extinction of 0.23 per km		

Notes: µg/m^3 = micrograms per cubic meter; km = kilometers; ppb = parts per billion; ppm = parts per million (by volume).

[a] California standards for ozone, carbon monoxide, SO_2 (1- and 24-hour), NO_2, particulate matter, and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[b] Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based on a reference temperature of 25 degrees Celsius (°C) and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[c] National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic means) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over three years, is equal to or less than the standard. The PM_{10} 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m^3 is equal to or less than one. The $PM_{2.5}$ 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.

[d] National primary standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

[e] National secondary standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[f] The California Air Resources Board has identified lead and vinyl chloride as toxic air contaminants with no threshold of exposure for adverse health effects determined. This allows for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

Source: EPA 2016 and CARB 2016a

Toxic Air Contaminants/Hazardous Air Pollutants

Toxic Air Contaminants (TACs), or in federal parlance, hazardous air pollutants (HAPs) are a defined set of airborne pollutants that may pose a present or potential hazard to human health. A TAC is defined as an air pollutant that may cause or contribute to an increase in mortality or in serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air; however, their high toxicity or health risk may pose a threat to public health even at low concentrations.

A wide range of sources, from industrial plants to motor vehicles, emit TACs. The health effects associated with TACs are quite diverse and generally are assessed locally, rather than regionally. TACs can cause long-term health effects such as cancer, birth defects, neurological damage, asthma, bronchitis or genetic damage; or short-term acute affects such as eye watering, respiratory irritation (a cough), running nose, throat pain, and headaches.

For evaluation purposes, TACs are separated into carcinogens and non-carcinogens based on the nature of the physiological effects associated with exposure to the pollutant. Carcinogens are assumed to have no safe threshold below which health impacts would not occur. This contrasts with criteria air pollutants, for which acceptable levels of exposure can be determined and for which ambient standards have been established (Table 1). Cancer risk from TACs is expressed as excess cancer cases per one million exposed individuals, typically over a lifetime of exposure.

EPA and CARB regulate HAPs and TACs, respectively, through statutes and regulations that generally require the use of the maximum achievable control technology or best available control technology (BACT) for toxics to limit emissions.

3.1.2 State

TACs in California are regulated primarily through the Tanner Air Toxics Act (Assembly Bill [AB] 1807, Chapter 1047, Statutes of 1983) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (Hot Spots Act) (AB 2588, Chapter 1252, Statutes of 1987). AB 1807 sets forth a formal procedure for CARB to designate substances as TACs. Research, public participation, and scientific peer review are required before CARB can designate a substance as a TAC. To date, CARB has identified more than 21 TACs and adopted EPA's list of HAPs as TACs. Most recently, PM exhaust from diesel engines (diesel PM) was added to CARB's list of TACs.

After a TAC is identified, CARB then adopts an airborne toxics control measure for sources that emit that particular TAC. If a safe threshold exists for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If no safe threshold exists, the measure must incorporate BACT for toxics to minimize emissions.

The Hot Spots Act requires that existing facilities that emit toxic substances above a specified level prepare an inventory of toxic emissions, prepare a risk assessment if emissions are significant, notify the public of significant risk levels, and prepare and implement risk reduction measures.

CARB has adopted diesel PM control measures and more stringent emissions standards for various transportation-related mobile sources of emissions, including transit buses, and off-road diesel equipment (e.g., tractors, generators). Over time, the replacement of older vehicles will result in a vehicle fleet that produces substantially lower levels of TACs than under current conditions. Mobile-source emissions of TACs (e.g., benzene, 1-3-butadiene, diesel PM) have been reduced significantly over the last decade and will be reduced further in California through a progression of regulatory measures (e.g., Low Emission Vehicle/Clean Fuels and Phase II reformulated gasoline regulations) and control technologies. With implementation of CARB's Risk Reduction Plan, it is expected that diesel PM concentrations will be 85 percent less in 2020 in

comparison to year 2000 (CARB 2000). Adopted regulations are also expected to continue to reduce formaldehyde emissions emitted by cars and light-duty trucks. As emissions are reduced, it is expected that risks associated with exposure to the emissions will also be reduced.

3.1.3 Local

South Coast Air Quality Management District

SCAQMD is the primary agency responsible for planning to meet NAAQS and CAAQS in the South Coast Air Basin (SCAB). SCAQMD periodically updates the Air Quality Management Plan (AQMP) which is submitted to be included in the State SIP (SCAQMD 2017). The SIP is a compilation of plans and regulations that govern how the region and State will comply with the CAA requirements to attain and maintain the national ambient air quality standards (NAAQS) for ozone and $PM_{2.5}$.

Criteria Air Pollutants

SCAQMD has developed a set of guidelines for use by lead agencies when preparing environmental documents. The guidelines contain thresholds of significance for criteria pollutants and TACs, and also make recommendations for conducting air quality analyses. After SCAQMD guidelines have been consulted and the air quality impacts of a project have been assessed, the lead agency's analysis undergoes a review by SCAQMD who submits comments and suggestions to the lead agency for incorporation into the environmental document.

All projects under the GPU would be subject to adopted SCAQMD rules and regulations in effect at the time of construction. Specific rules applicable to the construction of land uses anticipated under the GPU may include but are not limited to the following:

- **Regulation II, Rule 201**: Permit to Construct. A person shall not build, erect, install, alter, or replace any equipment permit unit, the use of which may cause the issuance of air contaminants or the use of which may eliminate, reduce, or control the issuance of air contaminants without first obtaining written authorization for such construction from the Executive Officer. A permit to construct shall remain in effect until the permit to operate the equipment for which the application was filed as granted or denied, or the application is canceled.

- **Regulation II, Rule 203**: Permit to Operate. A person shall not operate or use any equipment permit unit, the use of which may cause the issuance of air contaminants, or the use of which may reduce or control the issuance of air contaminants, without first obtaining a written permit to operate from the Executive Officer.

- **Regulation IV, Rule 402**: Nuisance. A person shall not discharge from any source whatsoever such quantities of air contaminants or other materials which cause injury, detriment, nuisance or annoyance to any considerable number of persons or the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause or have natural tendency to cause injury or damage to business or property.

- **Regulation IV, Rule 403**: Fugitive Dust. The developer or contractor is required to implement Best Available Control Measures for all sources, and all forms of visible PM are prohibited from crossing any property line.

- **Regulation XI, Rule 1113**: Architectural Coatings. The manufacturer, distributor, and end user of architectural and industrial maintenance coatings to reduce volatile organic compounds (VOC) emissions

from the use of these coatings, primarily by placing limits on the VOC content of various coating categories.

- **Regulation XII, Rule 1186**: PM_{10} Emissions from Paved and Unpaved Roads, and Livestock Operations. The purpose of this rule is to reduce the amount of PM entrained in the ambient air as a result of vehicular travel on paved and unpaved public roads.

- **Regulation XIII, Rule 1301**: New Source Review, General. The purpose of this rule is to set forth pre-construction review requirements for new, modified, or relocated facilities, to ensure that the operation of such facilities does not interfere with progress in attainment of the NAAQS, and that future economic growth within the SCAQMD is not unnecessarily restricted. The specific air quality goal of this regulation is to achieve no net increases from new or modified permitted sources of nonattainment air contaminants or their precursors.

- **Regulation XIV, Rule 1401**: New Source Review of Toxic Air Contaminants. The rule specifies limits for maximum individual cancer risk, cancer burden, and noncancer acute and chronic hazard index from new permit units, relocations, or modifications to existing permit units which emit toxic air contaminants.

- **Regulation XIV, Rule 1403**: Asbestos Emissions from Demolition/Renovation Activities. The owner or operator of any demolition or renovation activity is required to have an asbestos study performed prior to demolition and to provide notification to SCAQMD prior to commencing demolition activities.

Toxic Air Contaminants

At the local level, air districts may adopt and enforce CARB control measures for TACs. Under SCAQMD Rule 201 ("Permit to Construct"), Rule 203 ("Permit to Operate"), Rule 1301 ("New Source Review, General"), Rule 1401 ("New Source Review of Toxic Air Contaminants"), all sources that possess the potential to emit TACs are required to obtain permits from SCAQMD. Permits may be granted to operations the emit TACs if they are constructed and operated in accordance with applicable regulations, including New Source Review standards and air toxics control measures. SCAQMD limits emissions and public exposure to TACs through a number of programs. SCAQMD prioritizes TAC-emitting stationary sources based on the quantity and toxicity of the TAC emissions and the proximity of the facilities to sensitive receptors. Sensitive receptors are people, or facilities that generally house people (e.g., schools, hospitals, residences), that may experience adverse effects from unhealthful concentrations of air pollutants.

Odors

Although offensive odors rarely cause any physical harm, they can be very unpleasant, leading to considerable stress among the public and often generating citizen complaints to local governments and SCAQMD. SCAQMD's Rule 402 (Nuisance) regulates odorous emissions.

3.2 ENVIRONMENTAL SETTING

The project site is located in the SCAB. The SCAB includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino counties. Existing air quality conditions in the area are determined by such natural factors as topography, meteorology, and climate, in addition to the amount of emissions released by existing air pollutant sources. However, regional air quality concentration data which has been updated since the 2011 General Plan EIR is discussed below.

3.2.1 Criteria Air Pollutants

Concentrations of criteria air pollutants are used to indicate the quality of the ambient air. Ozone, PM_{10}, and $PM_{2.5}$ are the criteria air pollutants of primary concern in this analysis due to their nonattainment status with respect to the applicable NAAQS and/or CAAQS in the SCAB. Brief descriptions of these key criteria air pollutants in the SCAB and their health effects are provided below. Emission source types and health effects are summarized in Table 2. The attainment status of each criteria air pollutant with respect to the NAAQS and the CAAQS in the SCAB is provided in Table 3.

Table 2 Sources and Health Effects of Criteria Air Pollutants

Pollutant	Sources	Acute[1] Health Effects	Chronic[2] Health Effects
Ozone	Secondary pollutant resulting from reaction of ROG and NO_X in presence of sunlight. ROG emissions result from incomplete combustion and evaporation of chemical solvents and fuels; NO_X results from the combustion of fuels	increased respiration and pulmonary resistance; cough, pain, shortness of breath, lung inflammation	permeability of respiratory epithelia, possibility of permanent lung impairment
Carbon monoxide (CO)	Incomplete combustion of fuels; motor vehicle exhaust	headache, dizziness, fatigue, nausea, vomiting, death	permanent heart and brain damage
Nitrogen dioxide (NO_2)	combustion devices; e.g., boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines	coughing, difficulty breathing, vomiting, headache, eye irritation, chemical pneumonitis or pulmonary edema; breathing abnormalities, cough, cyanosis, chest pain, rapid heartbeat, death	chronic bronchitis, decreased lung function
Sulfur dioxide (SO_2)	coal and oil combustion, steel mills, refineries, and pulp and paper mills	Irritation of upper respiratory tract, increased asthma symptoms	Insufficient evidence linking SO_2 exposure to chronic health impacts
Respirable particulate matter (PM_{10}), Fine particulate matter ($PM_{2.5}$)	fugitive dust, soot, smoke, mobile and stationary sources, construction, fires and natural windblown dust, and formation in the atmosphere by condensation and/or transformation of SO_2 and ROG	breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular diseases, premature death	alterations to the immune system, carcinogenesis
Lead	metal processing	reproductive/ developmental effects (fetuses and children)	numerous effects including neurological, endocrine, and cardiovascular effects

Notes: NO_X = oxides of nitrogen; ROG = reactive organic gases.

[1] "Acute" refers to effects of short-term exposures to criteria air pollutants, usually at fairly high concentrations.

[2] "Chronic" refers to effects of long-term exposures to criteria air pollutants, usually at lower, ambient concentrations.

Sources: EPA 2016

Table 2 Attainment Status Designations for South Coast Air Basin

Pollutant	National Ambient Air Quality Standard	California Ambient Air Quality Standard
Ozone	Nonattainment (1-hour) Classification=Extreme	Nonattainment (1-hour)
	Nonattainment (8-hour)[1] Classification=Extreme	Nonattainment (8-hour)
	Nonattainment (8-hour)[2] Classification=Extreme	
Respirable particulate matter (PM_{10})	Attainment (24-hour) Classification = Maintenance	Nonattainment (24-hour)
		Nonattainment (Annual)
Fine particulate matter ($PM_{2.5}$)	Nonattainment (24-hour) Classification = Serious	(No State Standard for 24-Hour)
	Nonattainment (Annual)[3]	Nonattainment (Annual)
	Nonattainment (Annual)[4] Classification = Serious	
Carbon monoxide (CO)	Attainment (1-hour) Classification=Maintenance	Attainment (1-hour)
	Attainment (8-hour) Classification=Maintenance	Attainment (8-hour)
Nitrogen dioxide (NO_2)	Unclassified/Attainment (1-hour)	Attainment (1-hour)
	Attainment (Annual) Classification=Maintenance	Attainment (Annual)
Sulfur dioxide (SO_2)	(Designation Pending) (1-Hour)	Unclassifiable/Attainment (1-hour)
		Unclassifiable/Attainment (24-hour)
Lead (Particulate)	Nonattainment (3-month rolling avg.) Classification=Partial	Attainment (30-day average)
Hydrogen Sulfide	No Federal Standard	Attainment (1-hour)
Sulfates		Unclassifiable (24-hour)

Notes:
[1] 1997 Standard.
[2] 2008 Standard.
[3] 1997 Standard.
[4] 2012 Standard.
Source: SCAQMD 2016

3.2.2 Monitoring Station Data and Attainment Designations

Criteria air pollutant concentrations are measured at several monitoring stations in the SCAB. The Lake Elsinore, Perris, and Riverside-Rubidoux's average air quality data best represents the project area with recent data for ozone, PM_{10}, and $PM_{2.5}$. Table 4 summarizes the air quality data from the most recent three years (2016–2018).

Both CARB and EPA use this type of monitoring data to designate areas according to their attainment status for criteria air pollutants (attainment designations are summarized in Table 3 above).

Table 4 Summary of Annual Data on Ambient Air Quality (2016-2018)

	2016	2017	2018
Ozone			
Maximum concentration (1-hr/8-hr avg, ppm)	0.124/0.093	0.121/0.098	0.116/0.095
Number of days state standard exceeded (1-hr/8-hr)	15/*	23/*	16/*
Number of days national standard exceeded (1-hr/8-hr)	0/44	0/54	0/30

Table 4 Summary of Annual Data on Ambient Air Quality (2016-2018)

	2016	2017	2018
Fine Particulate Matter ($PM_{2.5}$)			
Maximum concentration (24-hour µg/m³)	51.5	50.3	66.3
Number of days national standard exceeded (24-hour measured)	5	7	3
Respirable Particulate Matter (PM_{10})			
Maximum concentration (µg/m³)	76.0	75.4	64.4
Number of days state standard exceeded	5	11	2
Number of days national standard exceeded	0	0	0

Notes: µg/m³ = micrograms per cubic meter; ppm = parts per million; * = Data not available; Ozone (O_3) measurements from Lake Elsinore-W Flint Street Monitoring Station. Fine particulate matter ($PM_{2.5}$) from the Riverside-Rubidoux Monitoring Station. Respirable particulate matter (PM_{10}) measurements form Perris Monitoring Station.

Source: CARB 2019

TOXIC AIR CONTAMINANTS

According to the *California Almanac of Emissions and Air Quality* (CARB 2013), the majority of the estimated health risks from TACs can be attributed to relatively few compounds, the most important being diesel PM. Diesel PM differs from other TACs in that it is not a single substance, but rather a complex mixture of hundreds of substances. Although diesel PM is emitted by diesel-fueled internal combustion engines, the composition of the emissions varies depending on engine type, operating conditions, fuel composition, lubricating oil, and whether an emissions control system is being used. Unlike the other TACs, no ambient monitoring data are available for diesel PM because no routine measurement method currently exists. However, CARB has made preliminary concentration estimates based on a PM exposure method. This method uses the CARB emissions inventory's PM_{10} database, ambient PM_{10} monitoring data, and the results from several studies to estimate concentrations of diesel PM. In addition to diesel PM, the TACs for which data are available that pose the greatest existing ambient risk in California are benzene, 1,3-butadiene, acetaldehyde, carbon tetrachloride, hexavalent chromium, para-dichlorobenzene, formaldehyde, methylene chloride, and perchloroethylene. Overall, levels of most TACs, except para-dichlorobenzene and formaldehyde, have decreased since 1990 (CARB 2013).

ODORS

Odors are generally regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache).

With respect to odors, the human nose is the sole sensing device. The ability to detect odors varies considerably among the population and overall is quite subjective. Some individuals can smell very minute quantities of specific substances; others may not have the same sensitivity but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor; an odor that is offensive to one person may be perfectly acceptable to another (e.g., fast food restaurant). It is important to also note that an unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. This is because of the phenomenon known as odor fatigue, in which a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity. Odor sources of concern can include wastewater treatment plants, sanitary landfills, composting facilities, recycling

facilities, petroleum refineries, chemical manufacturing plants, painting operations, rendering plants, and food packaging plants.

EXISTING EMISSIONS SOURCES

The 2011 General Plan EIR summarized emissions of criteria air pollutants and ozone precursors within the City for various source categories in 2008. Table 5, *2011 General Plan Summary of 2035 Estimated Emissions Inventory for the City of Murrieta*, summarizes the emissions for area, mobile, and indirect source categories. According to the emissions inventory, mobile sources account for the greatest contribution to the estimate annual average emissions of air pollutants.

Table 5 2011 General Plan Summary of 2035 Estimated Emissions Inventory for the City of Murrieta

Source Type	Estimated Annual Average Emissions (Tons/Year)					
	ROG	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Area Sources						
Natural Gas Combustion	14.23	188.52	109.40	0.00	0.35	0.35
Landscaping Equipment	48.10	3.02	267.22	0.01	0.71	0.70
Consumer Products	416.47	-	-	-	-	-
Architectural Coatings	78.67	-	-	-	-	-
Subtotal (Area Sources)	557.47	191.54	376.62	0.01	1.06	1.05
Indirect Sources						
Energy Consumption	4.47	514.00	0.09	53.70	17.90	-
Water Conveyance	0.11	12.60	2.20	1.32	0.44	-
Subtotal (Indirect Sources)	4.58	526.60	2.29	55.02	18.34	0.00
Mobile Sources (by land use category)						
Single Family Housing	425.40	594.36	5,090.88	5.76	992.57	193.26
Multifamily Housing	115.60	156.97	1,344.52	1.52	262.14	51.04
High School [civic/institutional]	18.14	26.37	217.64	0.25	43.98	8.55
City Park	8.81	8.80	72.34	0.08	14.66	2.85
Strip Mall	918.75	1,400.62	11,486.63	13.38	2,331.08	453.11
Professional Office	246.53	354.02	2,972.14	3.43	593.68	115.48
Office Park [business park]	180.87	560.13	2,200.81	2.53	437.33	85.09
General Light Industrial	15.17	21.00	177.83	0.20	35.31	6.87
Subtotal (Mobile Sources)	1,929.27	3,122.27	23,562.79	27.15	4,710.75	916.25
TOTAL	2,491.32	3,840.41	23,941.70	82.18	4,730.15	917.30

Notes: Tons/year = tons per year; ROG = reactive organic gases; NO_X = oxides of nitrogen; CO = carbon monoxide; SOx = sulfur dioxide; PM_{10} = respirable particulate matter; $PM_{2.5}$ = fine particulate matter

Source: City of Murrieta 2011

SENSITIVE RECEPTORS

Sensitive receptors are generally considered to include those land uses where exposure to pollutants could result in health-related risks to sensitive individuals, such as children or the elderly. Sensitive receptors are people, or facilities that generally house people (e.g., schools, hospitals, residences), that may experience

adverse effects from unhealthful concentrations of air pollutants. Sensitive receptors mentioned in the 2011 General Plan EIR are consistent with GPU.

3.3 IMPACTS AND MITIGATION MEAURES

3.3.1 Methodology

Regional and local criteria air pollutant emissions and associated impacts, as well as impacts from TACs, CO concentrations, and odors were assessed in accordance with SCAQMD-recommended methodologies. Attachment A provides modeling and emissions calculations according to SCAQMD guidelines. Potential impacts from construction were assessed qualitatively as the specific duration, frequency, and intensity of construction activities that could occur under the GPU are unknown at this time. Operations of the GPU land use changes were calculated using the California Emissions Estimator Model (CalEEMod) Version 2016.3.2 computer program, as recommended by SCAQMD. Plan-specific information, where available, and default values according to land use type and location in CalEEMod were used to model the net change of operational emissions. Mobile-source emissions were also modeled in CalEEMod using the net vehicle miles traveled (VMT) as provided in the VMT analysis provided in the *Vehicle Miles Travel (VMT) Analysis* by VRPA Technologies, Inc in June 2019. Emissions associated with consumption of energy (electricity and natural gas), the use of consumer products, and landscape maintenance activities were estimated using the applicable modules in CalEEMod. Operational emissions from all sources were estimated for full buildout of the GPU which is anticipated to occur by 2035.

TACs and mobile source CO impacts were assessed qualitatively, using the screening criteria set forth by SCAQMD and CARB and results from the VMT Analysis by VRPA Technologies, Inc.

The assessment of odor-related impacts is based on the types of odor sources associated with the land uses that would be developed under the project and their location relative to existing off-site sensitive receptors.

3.3.2 Thresholds of Significance

The Initial Study Environmental Checklist, Appendix G of the CEQA Guidelines, was used as the significance criteria in the 2011 General Plan EIR. Since the 2011 General Plan EIR was certified, Appendix G has been updated. A project would have a significant effect on the environment if it would:

- Conflict with or obstruct implementation of the applicable air quality plan.
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable State or federal ambient air quality standard.
- Expose sensitive receptors to substantial pollutant concentrations.?
- Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

Appendix G of the CEQA Guidelines states that the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make these determinations. SCAQMD's mass daily significance thresholds for both construction and operation of the project are provided in the 2011 General Plan EIR (Table 5.5-5, page 5.5-14) and have not changed for the

purpose of this analysis. Thus, the air quality impact analysis for the GPU relies on SCAQMD's significance criteria.

3.3.3 Project Impacts

Impact AQ -1 Construction emissions of criteria pollutants and precursors

The level of significance in the 2011 General Plan EIR for short-term construction-related impacts was potentially significant. Because the 2011 General Plan EIR was at a program level, project specific construction activities and data were unable to be determined. The 2011 General Plan EIR concluded that because individual projects have the potential to result in emissions of criteria air pollutants and precursors from activities, the construction of the proposed land uses under the 2011 General Plan could contribute to nonattainment designations.

The 2011 General Plan includes the following goals and policies that would help reduce individual project construction emissions to achieve clean air standards. Air Quality Element Goal AQ-3 addresses the reduction of emissions during construction activities. Policies AQ-3.1 through AQ-3.3 would require construction activities to adhere to SCAQMD regulations, ensure best management practices are implemented, and require construction equipment to comply with CARB vehicle standards. Additionally, Policy AQ-3.4 requires projects to prepare and implement Construction Management Plans, which shall include dust control measures, vehicle emission standards, among other emission-reducing control measures. These policies would require construction related emissions for individual projects to be reduced to a level below daily emissions standards established by the SCAQMD. Goal AQ-7 would also reduce fugitive dust emissions throughout the City. Policies AQ-7.2 through AQ-7.4 would minimize fugitive dust from construction through collaborative efforts and would consider the suspension of all grading operations at project sites when the source represents a public nuisance or potential safety hazard.

The GPU would allow for development of an additional 1,572 residential units, beyond those considered in the 2011 General Plan. Construction of these 1,572 new residential units under the proposed GPU would result in a net increase in emissions beyond those analyzed for the 2011 General Plan. Construction-related activities associated with the implementation of the proposed residential units would generate emissions of ROG, NO_X, SO_X, CO, PM_{10}, and $PM_{2.5}$ from site preparation; use of off-road construction equipment; material handling; on-road vehicle trips; architectural coating; paving; and other construction-related activities.

Because of the program-level nature of the GPU, specific information about individual land use developments, and the duration, frequency, and intensity of construction, and potential overlap between construction activities is not available at this time. Therefore, construction-related emissions due to the implementation of the GPU cannot be accurately quantified, and such an analysis would be considered speculative. In addition, the GPU would reduce 2,405,601 square feet of non-residential development in the City. From time of adoption of the GPU to buildout year 2035, construction projects would occur throughout the City and would be dependent upon factors such as the nature and quantity of projects initiated by developers and approvals by the City, thus the timing, rate, and level of future construction emissions emitted cannot be precisely anticipated under the general provisions of the GPU.

As stated in the 2011 General Plan EIR Section 5.5.4, all goals and policies related to reducing criteria air pollutants and precursors would be required to be addressed in all construction projects within the City (page 5.5-16). However, even with implementation of the 2011 General Plan goals and policies, the GPU construction projects could have the potential to exceed SCAQMD construction thresholds. Ambient air quality standards are established to be protective of public health and if exceeded could expose receptors to adverse health impacts. Because implementation of the project has the potential to exceed SCAQMD's construction thresholds, the GPU could exacerbate or interfere with the region's ability to attain the health-

based standards. Impact AQ-1 would be potentially significant for the proposed GPU, consistent with the potentially significant impact identified in the 2011 General Plan EIR. Compared to the construction-related air quality impacts that would occur in the 2011 General Plan, the GPU would not result in a new significant impact or a substantial increase in the severity of the previously identified significant impact.

Mitigation Measures

The following mitigation measures were recommended by SCAQMD in their comment letter on the *Notice of Preparation of a Draft Supplemental Environmental Impact Report for the Proposed Murrieta General Plan Update and Draft Supplemental Environmental Impact Report* on March 12, 2019. The City shall require implementation of the following mitigation measures in addition to the goals and policies from the 2011 General Plan.

- *Require the use of Tier 4 emissions standards or better for off-road diesel-powered construction equipment of 50 horsepower or greater. To ensure that Tier 4 construction equipment or better will be used during the Proposed Project's construction, SCAQMD staff recommends that the Lead Agency include this requirement in applicable bid documents, purchase orders, and contracts. Successful contractor(s) must demonstrate the ability to supply the compliant construction equipment for use prior to any ground disturbing and construction activities. A copy of each unit's certified tier specification or model year specification and California Air Resources Board (CARB) or SCAQMD operating permit (if applicable) shall be available upon request at the time of mobilization of each applicable unit of equipment. Additionally, the Lead Agency should require periodic reporting and provision of written construction documents by construction contractor(s) to ensure compliance and conduct regular inspections to the maximum extent feasible to ensure compliance.*

- *Require zero-emissions or near-zero emission on-road haul trucks such as heavy-duty trucks with natural gas engines that meet the CARB's adopted optional NOx emissions standard at 0.02 grams per brake horsepower-hour (g/bhp-hr), if and when feasible. At a minimum, require that construction vendors, contractors, and/or haul truck operators commit to using 2010 model year trucks (e.g., material delivery trucks and soil import/export) that meet CARB's 2010 engine emissions standards at 0.01 g/bhp-hr of particulate matter (PM) and 0.20 g/bhp-hr of NOx emissions or newer, cleaner trucks3. The Lead Agency should include this requirement in applicable bid documents, purchase orders, and contracts. Operators shall maintain records of all trucks associated with project construction to document that each truck used meets these emission standards, and make the records available for inspection. The Lead Agency should conduct regular inspections to the maximum extent feasible to ensure compliance.*

- *Suspend all on-site construction activities when wind speeds (as instantaneous gusts) exceed 25 miles per hour.*

- *All trucks hauling dirt, sand, soil or other loose materials are to be covered, or should maintain at least two feet of freeboard in accordance with California Vehicle Code Section 23114 (freeboard means vertical space between the top of the load and top of the trailer).*

- *Enter into applicable bid documents, purchase orders, and contracts to notify all construction vendors, contractors, and/or haul truck operators that vehicle and construction equipment idling time will be limited to no longer than five minutes, consistent with the CARB's policy4. For any idling that is expected to take longer than five minutes, the engine should be shut off. Notify construction vendors, contractors, and/or haul truck operators of these idling requirements at the time that the purchase order is issued and again when vehicles enter the Proposed Project site. To further ensure that drivers*

understand the vehicle idling requirement, post signs at the Proposed Project site, where appropriate, stating that idling longer than five minutes is not permitted.

- *Have truck routes clearly marked with trailblazer signs, so that trucks will not enter residential areas.*

- *Limit the daily number of trucks allowed at the Proposed Project to levels analyzed in the CEQA document. If higher daily truck volumes are anticipated to visit the site, the Lead Agency should commit to re-evaluating the Proposed Project through the CEQA process prior to allowing this land use or higher activity level.*

Impact AQ -2 Direct operational emissions of criteria pollutants

The 2011 General Plan EIR concluded that long-term operational emissions for the 2011 General Plan would cause a potentially significant air quality impact. It was determined that with the exception of some projects under the 2011 General Plan, others may potentially exceed SCAQMD's project specific significance thresholds. The overall magnitude of all operational emissions at build out of the 2011 General Plan would contribute to nonattainment designations in the SCAB.

The 2011 General Plan provides goals and policies that help reduce emissions from stationary sources that would be applicable to the land use changes under the GPU, in addition those discussed below. Goal AQ-1 of the proposed General Plan Air Quality Element would improve air quality within the City through participation in regional and local efforts. Policies AQ-1.1 through AQ1.5 would achieve this goal by updating City regulations, working with State, federal, and local agencies (including Southern California Association of Governments [SCAG]), reviewing and updating City regulations and requirements based on new technology, helping implement SB 375, and providing public education on clean products. Additionally, Goal AQ-2 addresses land use and air quality relationships. Specifically, Policies AQ-2.1 through AQ-2.5 consider the location of sensitive receptors near pollution sources and freeways, and considering these impacts when making siting decisions, and consult the CARB handbook for siting sensitive uses at safe distances from polluters. Goal AQ-6 aims to minimize stationary source pollution. Policies AQ-6.1 through AQ-6.4 would ensure that industrial and commercial uses adhere to SCAQMD rules and regulations, encourage the use of new technology, and promote smart land use planning to ensure sensitive receptors are not subject to harmful emissions. Policies AQ-6.5 through AQ-6.7 would also ensure indoor air quality is improved for residential uses near high levels of pollution and would employ strategies to mitigate air quality impacts.

In addition, the 2011 General Plan provides goals and policies that address reducing emissions from mobile sources. Goal AQ-4 and Policies AQ-4.1 through AQ-4.4 would reduce vehicle miles traveled (VMT) and associated mobile source emissions through job creation and the improvement of the jobs/housing balance within the City, as well as the encouragement of a mix of housing types located near job opportunities. Goal AQ-5 aims to improve air quality through an efficient circulation system, reduced traffic congestion, and reduced VMT. Policy AQ-5.1 encourages employers to implement transportation demand management (TDM) measures (i.e., transit subsidies, bicycle facilities, telecommuting, etc.). Policies CIR-5.9 through CIR-5.12, and CIR-6.1 through CIR-6.12 of the proposed General Plan 2035 Circulation Element promote mass transit, high-speed rail, and nonmotorized transit facilities. Policies AQ-5.4 through AQ-5.7 encourage the reduction of air emissions through the use of low emission technology, trip reduction plans, and reduced emission equipment and vehicles. Circulation and Land Use Element Policies CIR-1.4, LU-8.1 (Land Use Element), and LU-8.2 would improve signal coordination at major intersections, encourage mixed-use development, and promote non-motorized transportation options (i.e., bicycle and pedestrian).

The GPU provides revised goals and policies that are applicable to reducing operations-related emissions. Land Use policies LU-7.9 through 7.10 provides residents with access to other land uses. Policies LU-17.3 through 17.6 encourage mixed-use development that provide various sources to the community. Circulation policy CIR-6.15 encourage adoption of VMT measurement for CEQA evaluations.

Operation of the proposed 1,572 residential units would result in the generation of long-term operational emissions of ROG, NO_X, PM_{10}, $PM_{2.5}$, SO_X and CO. The non-residential development excluded from the 2011 General Plan would avoid the generation of long-term operational emissions. The addition of residential units would serve to increase emissions beyond those analyzed in the 2011 General Plan EIR, while the reduction in allowable non-residential development would reduce emissions from the same analysis. In addition to the land use changes, citywide VMT was assessed to determine the change in VMT from the two General Plans. The net 2035 citywide VMT under the 2011 General Plan compared to the GPU, provided by VRPA Technologies, Inc., was estimated to be a decrease of 93,028 miles. This decrease in VMT is due to the proposed increase in residential units to be oriented toward employment areas, reducing the VMT to and from residences and places of employment.

Additional sources of operational emissions evaluated for this study include the use of electricity and natural gas; landscape maintenance equipment such as mowers and leaf blowers; application of architectural coatings as part of regular maintenance; and the use of various consumer produce such as cleaning chemicals that would also generate emissions of ROG. Because building energy efficiency is unknown for build out year 2035, energy emissions were modeled conservatively based on 2019 Title 24 standards. Table 6 summarizes the net change in maximum daily operations-related emissions of criteria air pollutants and precursors from the land uses proposed under the GPU.

Table 6 Net emissions of General Plan Update

Source Type	Estimated Maximum Daily Emissions (lb/day)					
	ROG	NO_x	CO	SO_X	PM_{10}	$PM_{2.5}$
General Plan Update: Net Residential Unit Increase						
Area	38	1	129	<1	1	1
Energy	<1	4	2	<1	<1	<1
Subtotal	38	6	131	<1	1	1
General Plan Update: Net Non-Residential Land Use Decrease						
Area	-54	- <1	- <1	- <1	- <1	- <1
Energy	-2	-18	-15	– <1	-1	-1
Subtotal	-56	-18	-15	- <1	-1	-1
General Plan Update: Net Mobile Decrease						
Subtotal	-10	-77	-120	-1	-71	-19
General Plan Update Net TOTAL	**-27**	**-89**	**-4**	**-1**	**-71**	**-19**
SCAQMD Thresholds of Significance	55	55	550	150	150	55
Threshold Exceeded?	No	No	No	No	No	No

Notes: lb/day = pounds per day; ROG = reactive organic gases; NO_X = oxides of nitrogen; CO = carbon monoxide; SO_X = sulfur dioxide; PM_{10} = respirable particulate matter; $PM_{2.5}$ = fine particulate matter; SCAQMD = South Coast Air Quality Management District.

Table 6 shows that the GPU would decrease overall citywide emissions relative to overall development under the 2011 General Plan. However, the reduction in emissions would not reduce overall operations emissions to below SCAQMD's significance threshold. Furthermore, the land uses proposed under the GPU with the increase in residential units, decrease in nonresidential square footage, and decrease in VMT would contribute to nonattainment designations.

If the project exceeds SCAQMD's thresholds and contributes to nonattainment designations, it would exacerbate or interfere with the region's ability to attain the health-based standards. Thus, the exposure of

criteria air pollutants that may exceed the NAAQS and CAAQS would exacerbate health impacts. Full buildout of the GPU's land uses would cause emissions to exceed SCAQMD's recommended thresholds, violating air quality standards and would contribute substantially to an existing or projected air quality violation. Because the ambient air quality standards are established to be protective of public health, adverse health impacts to receptors are anticipated due to the project's emissions being above SCAQMD's thresholds. As individual developments anticipated under the GPU are evaluated, potential impacts to nonattainment levels and health risk may be found to not be significant. For this program level analysis, Impact AQ-2 would be potentially significant for the proposed GPU, consistent with the potentially significant impact identified in the 2011 General Plan EIR. Compared to the operations-related air quality impacts that would occur in the 2011 General Plan, the GPU would not result in a new significant impact or a substantial increase in the severity of the previously identified significant impact

Mitigation Measures

The following mitigation measures were recommended by SCAQMD in their comment letter on the *Notice of Preparation of a Draft Supplemental Environmental Impact Report for the Proposed Murrieta General Plan Update and Draft Supplemental Environmental Impact Report* on March 12, 2019. The City shall require implementation of the following mitigation measures in addition to the goals and policies from the 2011 General Plan and those under the GPU.

- *Provide electric vehicle (EV) Charging Stations (see the discussion below regarding EV charging stations).*

- *Should the Proposed Project generate significant regional emissions, the Lead Agency should require mitigation that requires accelerated phase-in for non-diesel powered trucks. For example, natural gas trucks, including Class 8 HHD trucks, are commercially available today. Natural gas trucks can provide a substantial reduction in health risks, and may be more financially feasible today due to reduced fuel costs compared to diesel. In the Draft SEIR, the Lead Agency should require a phase-in schedule for these cleaner operating trucks to reduce any significant adverse air quality impacts. SCAQMD staff is available to discuss the availability of current and upcoming truck technologies and incentive programs with the Lead Agency.*

- *Trucks that can operate at least partially on electricity have the ability to substantially reduce the significant NOx impacts from this project. Further, trucks that run at least partially on electricity are projected to become available during the life of the project as discussed in the 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy (2016-2040 RTP/SCS)[5]. It is important to make this electrical infrastructure available when the project is built so that it is ready when this technology becomes commercially available. The cost of installing electrical charging equipment onsite is significantly cheaper if completed when the project is built compared to retrofitting an existing building. Therefore, SCAQMD staff recommends the Lead Agency require the Proposed Project and other plan areas that allow truck parking to be constructed with the appropriate infrastructure to facilitate sufficient electric charging for trucks to plug-in. Similar to the City of Los Angeles requirements for all new projects, SCAQMD staff recommends that the Lead Agency require at least 5% of all vehicle parking spaces (including for trucks) include EV charging stations[6]. Further, electrical hookups should be provided at the onsite truck stop for truckers to plug in any onboard auxiliary equipment. At a minimum, electrical panels should be appropriately sized to allow for future expanded use.*
- *Design warehouses or distribution centers such that entrances and exits are such that trucks are not traversing past neighbors or other sensitive receptors.*

- *Design warehouses or distribution centers such that any check-in point for trucks is well inside the site to ensure that there are no trucks queuing outside of the facility.*
- *Design warehouses or distribution centers to ensure that truck traffic within the site is located away from the property line(s) closest to its residential or sensitive receptor neighbors.*
- *Restrict overnight parking in residential areas.*
- *Establish overnight parking within warehouses or distribution centers where trucks can rest overnight.*
- *Establish area(s) within warehouses or distribution centers for repair needs.*
- *Develop, adopt and enforce truck routes to and from warehouses or distribution centers that avoid sensitive receptors, where feasible.*
- *Create a buffer zone of at least 300 meters (roughly 1,000 feet), which can be office space, employee parking, greenbelt, etc. between warehouses or distribution centers and sensitive receptors.*
- *Maximize use of solar energy including solar panels; installing the maximum possible number of solar energy arrays on the building roofs and/or on the Proposed Project site to generate solar energy for the facility.*
- *Maximize the planting of trees in landscaping and parking lots.*
- *Use light colored paving and roofing materials (e.g., "cool" roofs and cool pavements).*
- *Utilize only Energy Star heating, cooling, and lighting devices, and appliances.*
- *Require use of electric or alternatively fueled sweepers with HEPA filters.*
- *Use of water-based or low VOC cleaning products.*

Impact AQ -3 Expose sensitive receptors to substantial pollutant concentrations

The 2011 General Plan EIR concludes that cumulative exposure to substantial pollutant concentrations is a less than significant impact and the 2011 General Plan includes goals and policies addressing pollutants and sensitive receptor exposure. The exposure of sensitive receptors to TAC emissions from project-generated construction and operational sources is discussed separately below. Diesel PM is the focus of this analysis because it is the TAC of primary concern when evaluating health risk. Although other TACs exist (e.g., benzene, 1,3-butadiene, hexavalent chromium, formaldehyde, methylene chloride), they are primarily associated with industrial operations.

Construction

Construction-related activities associated with the project would result in temporary, intermittent emissions of diesel PM from the exhaust of off-road heavy-duty diesel equipment use for site preparation (e.g., demolition, clearing, grading); paving; application of architectural coatings; on-road truck travel; and other miscellaneous activities. For construction activity, diesel PM is the primary TAC of concern. On-road diesel-powered haul trucks traveling to and from the construction area to deliver materials and equipment are less of a concern because they would not stay on the site for long durations.

Diesel PM was identified as a TAC by CARB in 1998. The potential cancer risk from the inhalation of diesel PM outweighs the potential for all other health impacts (i.e., non-cancer chronic risk, short-term acute risk) and health impacts from other TACs (CARB 2003). With regards to exposure of diesel PM, the dose to which receptors are exposed is the primary factor used to determine health risk. Dose is a function of the concentration of a substance or substances in the environment and the duration of exposure to the substance. Dose is positively correlated with time, meaning that a longer exposure period would result in a higher level of health risk for any exposed receptor. According the California Office of Environmental Health and Assessment's (OEHHA's) 2015 Guidance, exposure of sensitive receptors to TAC emissions should be based on a 30-year exposure period for estimating cancer risk at the maximum exposed individual resident (MEIR), with 9- and 70-year exposure periods at the MEIR as supplemental information. Furthermore, 70-year exposure period is required for estimating cancer burden or providing an estimate of population-wide risk (OEHHA 2015:8-1).

The use of off-road heavy-duty diesel equipment would be limited to the individual construction project under the GPU. Because construction details for individual project under the GPU are unknown, this analysis is unable to determine the dose of exposure to any one sensitive receptor. Construction projects are required to comply with the goals and policies under the 2011 General Plan, GPU, and SCAQMD standards and therefore no new or worse impacts would result from construction projects.

Operations

The operational TAC analysis evaluates new sources associated with the GPU build out (e.g., increased vehicular traffic, stationary or commercial land uses) and the placement of new sensitive receptors in close proximity to existing TAC sources. The analysis is based on available guidance from CARB and SCAQMD shown below in Table 7.

Table 7 California Air Resources Board Recommendations on Siting New Sensitive Land Uses Such as Residences, Schools, Daycare Centers, Playgrounds, or Medical Facilities

Source Category	Advisory Recommendations
Freeways and High-Traffic Roads	◢ Avoid siting new sensitive land uses within 500 feet of a freeway, urban roads with 100,000 vehicles/day, or rural roads with 50,000 vehicles/day
Distribution Centers	◢ Avoid siting new sensitive land uses within 1,000 feet of a distribution center (that accommodates more than 100 trucks per day, more than 40 trucks with TRUs operating per day, or where TRU unit operations exceed 300 hours per week). ◢ Take into account the configuration of existing distribution centers and avoid locating residences and other new sensitive land uses near entry and exit points
Rail Yards	◢ Avoid siting new sensitive land uses within 1,000 feet of a major service and maintenance rail yard. ◢ Within one mile of a rail yard, consider possible siting limitations and mitigation approaches
Ports	◢ Avoid siting of new sensitive land uses immediately downwind of ports in the most heavily impacted zones. Consult local air districts or the CARB on the status of pending analyses of health risks.
Refineries	◢ Avoid siting new sensitive land uses immediately downwind of petroleum refineries. Consult with local air districts and other local agencies to determine an appropriate separation.
Chrome Platers	◢ Avoid siting new sensitive land uses within 1,000 feet of a chrome plater
Dry Cleaners Using Perchloroethylene	◢ Avoid siting new sensitive land uses within 300 feet of any dry-cleaning operation. For operations with two or more machines, provide 500 feet. For operations with 3 or more machines, consult with the local air district. ◢ Do not site new sensitive land uses in the same building with perc dry cleaning operations.
Gasoline Dispensing Facilities	◢ Avoid siting new sensitive land uses within 300 feet of a large gas station (defined as a facility with a throughput of 3.6 million gallons per year or greater). A 50-foot separation is recommended for typical gas dispensing facilities.

Notes: CARB = California Air Resources Board; TRU = transport refrigeration unit; vehicles/day = vehicles per day

Source: CARB 2005

Operation of new land uses could generate new sources of TACs from commercial land uses (e.g., gasoline dispensing facilities and dry cleaners). Land uses that have the potential to generate stationary source emissions would be required to obtain a permit from SCAQMD. If the facility has the potential to generate health risks above established risk levels, facilities are required to distribute public notifications to both residential, non-residential, and parents of children attending school within the area of impact and develop and implement a risk reduction plan.

In addition, the GPU would result in a decrease in 93,028 vehicle trips distributed over the City roadways and intersections. In accordance with CARB's Air Quality and Land Use Handbook, high volume roads and freeways are the primary sources of TACs within urban areas. Freeways or urban roads experiencing 100,000 or more vehicles/day could expose sensitive receptors to adverse health risks. It is likely under this project that freeways and roads within the project area would not exceed 100,000 vehicles/day. Because the GPU would result in a substantial decrease in trips to the City's roadway network, a substantial decrease in health risk levels associated with vehicular traffic, exposing existing and future planned land uses to

decreased TAC levels. There would be no additional or worse impacts than those determined in the 2011 General Plan.

Conclusion

Implementation of the goals and policies included in the 2011 General Plan, SCAQMD's permit requirements for stationary sources, and the reduction in future citywide VMT relative to the 2011 General Plan would reduce the health risk to sensitive receptors. Impact AQ-3 would be less than significant for the proposed GPU, consistent with the less than significant impact identified in the 2011 General Plan EIR. The GPU would not result in a new significant impact or a substantial increase in the severity of the previously identified significant impact.

Impact AQ-4 Create objectionable odors

The occurrence and severity of odor impacts depends on numerous factors, including: the nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of the affected receptors. While offensive odors rarely cause any physical harm, they still can be very unpleasant, leading to considerable distress among the public and often generate citizen complaints to local governments and regulatory agencies. Projects with the potential to frequently expose a substantial number of people to objectionable odors would be deemed to have a significant impact.

Odors evaluated in the 2011 General Plan were determined to have a less than significant impact due to the land uses proposed not being significant odor generators. Goals and policies provided in the 2011 General Plan would help reduce exposure of odors to sensitive receptors through land use decisions under the GPU. Policies AQ-2.1 through AQ-2.5 address siting sensitive receptors away from emission sources. Policy AQ-6.1 encourage the use of advanced technology to reduce criteria pollutants from sources.

Though construction project details under the GPU are unknown, odors from the use of heavy-duty diesel equipment, and the laying of asphalt during project-related construction activities would be intermittent and temporary and would dissipate rapidly from the source with an increase in distance.

The proposed land uses under the GPU are not considered significant odor generators that would adversely affect sensitive receptors during operations; all land uses would contain uses that are common in the surrounding areas. Operation of new development would be subject to goals and policies in the General Plan and shall be subject to SCAQMD Rule 402. In addition, future citywide VMT under the GPU would decrease relative to future citywide VMT under the 2011 General Plan, which would not increase and could reduce odors associated with on-road vehicles. Therefore, implementation of the GPU would not result in exposure of a substantial number of people to objectionable odors. Impact AQ-4 would be less than significant for the proposed GPU, consistent with the less than significant impact identified in the 2011 General Plan EIR. The GPU would not result in a new significant impact or a substantial increase in the severity of the previously identified significant impact.

Impact AQ-5 Mobile-source CO concentrations

Local mobile-source CO emissions near roadway intersections are a direct function of traffic volume, vehicle speed, and traffic delay. A CO hotspot is an area of localized CO pollution that is caused by severe vehicle congestion on major roadways, typically near intersections. Transport of CO is extremely limited because it disperses rapidly with distance from the source under normal meteorological conditions. However, under stable meteorological conditions, CO concentrations near roadways and/or intersections may reach unhealthy levels adversely affecting nearby sensitive land uses, such as residential units, hospitals, schools, and childcare facilities. CO is a pollutant of localized concern and, therefore, analyzed at the local level.

Construction activities are rarely a cause of localized CO impacts because they do not typically result in substantial traffic increases at any one location.

As discussed in the SCAQMD AQMP and seen in Table 3, the SCAB is in attainment for both 1-hour and 8-hour CO concentrations under CAAQS and NAAQS. As the AQMP notes, the SCAB gained attainment status for CO concentrations in 2007 and has remained in attainment status for this pollutant since that time. In 2015, SCAQMD measured CO concentrations at 25 locations in the SCAB as well as two locations that measured near-road CO concentrations. Maximum CO concentrations in Los Angeles County were 3.3 ppm for the 8-hour averaging time in 2015. This concentration is well below the NAAQS 1-hour and 8-hour standards (i.e.,35 ppm and 9 ppm, respectively; SCAQMD 2017). As part of the AQMP, SCAQMD also modeled future pollutant emissions within the SCAB based on population growth rates, current air quality regulations and other key factors for the year 2031. Modeling results found that although on-road mobile emissions continue to be a major contributor of CO and NO_X emissions, current rules and regulations on mobile source emissions will result in a decrease in CO concentrations within the SCAB by 2031 and will not impact the attainment status for CO (SCAQMD 2017:3-19).

The 2011 General Plan determined that there would be a less than significant impact to increase mobile-source CO concentrations with its adoption. It was concluded that at full build out, no intersection in the City would experience an average daily traffic (ADT) volume that would exceed 100,000 vehicles per day under CARBS's guidance. In addition, the 2011 goal and polices CIR-1.2, CIR-1.4, CIR-1.6, and CIR-1.8 would ensure intersections would optimize traffic flow through the City and reduce traffic queuing.

The *City of Murrieta Focused General Plan Update Traffic Impact Analysis* report by Iteris, Inc. analyzed key intersections and roadways under conditions of the GPU. Table 12 in the report determined that no intersection capacity or roadway would exceed 100,000 vehicle per day. Impact AQ-5 would be less than significant for the proposed GPU, consistent with the less than significant impact identified in the 2011 General Plan EIR. The GPU would not result in a new significant impact or a substantial increase in the severity of the previously identified significant impact.

Impact AQ-6 Conflict with or obstruct applicable air quality plan

The 2011 General Plan EIR identified a less than significant impact regarding its consistency with other regional plans due to its goals and policies falling under the same objectives as other plans. The two criteria required by SCAQMD for evaluation of plan consistency analyzed in the 2011 General Plan are relevant to this study. The first criterion requires projects to forecast emissions contributing to air quality violations and attainment. As mentioned in the 2011 General Plan, all future development is required to comply with SCAQMD regulations and permitting requirements. In addition, all developments would be subject to the goals and policies in the 2011 General Plan to help reduce air quality impacts. Because project-level construction details are not provided for this plan-level analysis, construction emissions are not able to be analyzed at the level of detail needed to determine whether they would contribute to an air quality violation. Operational emissions were determined to be less than significant and would not contribute to an air quality violation or deter attainment. As previously stated, individual project construction and operational project under the GPU would be required to comply with its goals and policies and SCAQMD regulations.

Under the second criterion, SCAQMD considers a project to be consistent with existing air quality plans and other relevant documents if the project's land use changes and growth rates remain consistent with those in the existing plan. Projects that do not increase dwelling unit density, vehicle trips, or VMT above the projected rates included in relevant air quality plans are not considered to exceed this threshold (SCAQMD 1993). The most relevant and applicable air quality plans for the SCAB are SCAQMD's 2016 AQMP and SCAG's 2016 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS). Regional air quality emissions projections used in the SIP and the AQMP are based on the growth projections included in the RTP/SCS. Therefore, projects that are consistent with these growth projections would also be consistent with regional air quality emissions projections and attainment status regarding CAAQS and NAAQS.

The GPU includes changes to the land uses upon which the AQMP and 2016 RTP/SCS were based on and therefore would result in an inconsistency between the plans. Although these plans are inconsistent, the focus of the GPU is to create a job to housing balance that would create jobs and reduce VMT within the City which is consistent with the goals of the RTP/SCS plan. Like the 2011 General Plan, the GPU includes several updated goals and policies within the Circulation, Land Use, Air Quality, Conservation, and Safety Elements pertaining to regional mobility, reduced vehicle trips, energy efficiency, smart land use patterns, and emergency management, which are consistent with SCAG's RTP goals and Compass Growth Visioning Regional Growth Principles. Furthermore, as described in Impact AQ-2 operational emissions would be lower under the GPU relative to the 2011 General Plan and would reduce the contribution towards an air quality violation or attainment. Additionally, all future development is required to comply with the goals and policies that would reduce air quality impacts. Impact AQ-6 would be less than significant for the proposed GPU, consistent with the less than significant impact identified in the 2011 General Plan EIR. The GPU would not result in a new significant impact or a substantial increase in the severity of the previously identified significant impact.

Cumulative Impacts

Construction-related emissions from future development under the GPU, similar to those discussed in the 2011 General Plan EIR, may be "cumulatively considerable" as they have the potential to be combined with the physical impacts of other past, present, or other probable future projects in the SCAB. If multiple large construction projects occur simultaneously in close proximity, it is possible that impacts associated with air quality violations could result from development of the project.

As described under Impact AQ-2, the proposed development under the GPU would reduce future operational emissions of criteria pollutants relative to the future emissions under the 2011 General Plan. However, the overall magnitude of operational emissions at full build out of the GPU would contribute to the adverse air quality conditions in the SCAB. Because operations emissions could contribute to nonattainment designations and adverse health impacts to sensitive receptors, the land uses under the GPU would be cumulatively considerable.

Exposure of TAC to sensitive receptors would be cumulative in nature if the project, in combination with other development, would expose sensitive receptors to a substantial concentration of TACs that would significant increase cancer risk, or acute or chronic health risks. As discussed under Impact AQ-3, although individual construction project details are unknown, the 2011 General Plan, GPU, and SCAQMD standards would avoid sensitive receptor exposure to TACs. In addition, the GPU land uses would result in a decrease in mobile source emissions and traffic concentrations would not exceed TAC thresholds. Therefore, no additional cumulative impacts would occur.

Impacts would be cumulative in nature if the project, in combination with cumulative development, would violate or contribute substantially to localized concentrations of CO that exceed the CAAQS or NAAQS for CO. Impact AQ-5 concludes that long-term operational mobile-source emissions of CO does not have the potential to violate or contribute substantially to local concentrations of CO.

As discussed in the 2011 General Plan EIR, cumulative development would not result in potentially significant impacts in terms of objectionable odors affecting a substantial number of receptors due to the type of land uses proposed.

Construction and operations of the land uses proposed under the GPU are required to comply with the goals and policies in the 2011 General Plan, GPU, and SCAQMD standards for reducing impacts from criterial air pollutants and overall cumulative impacts. The cumulative impacts of the GPU would be consistent with the cumulative impact conclusions identified in the 2011 General Plan EIR. The GPU would not result in a new significant impact or a substantial increase in the severity of a previously identified significant cumulative impact.

4 GREENHOUSE GASES

4.1 REGULATORY SETTING

4.1.1 Federal

In October 2012, EPA and the National Highway Traffic Safety Administration, on behalf of the U.S. Department of Transportation, issued final rules to further reduce GHG emissions and improve corporate average fuel economy (CAFE) standards for light-duty vehicles for model years 2017 and beyond (77 Federal Register [FR] 62624). These rules would increase fuel economy to the equivalent of 54.5 miles per gallon, limiting vehicle emissions to 163 grams of CO_2 per mile for the fleet of cars and light-duty trucks by model year 2025 (77 FR 62630). However, on April 2, 2018, the EPA administrator announced a final determination that the current standards are not appropriate and should be revised. It is not yet known what revisions will be adopted or when they will be implemented (EPA 2018).

In 2015, EPA unveiled the Clean Power Plan. The purpose of the plan was to reduce carbon dioxide (CO_2) emissions from electrical power generation by 32 percent relative to 2005 levels within 25 years. EPA is proposing to repeal the Clean Power Plan because of a change to the legal interpretation of Section 111(d) of the federal Clean Air Act, on which the Clean Power Plan was based. The comment period on the proposed repeal closed April 26, 2018.

In June 2019, the EPA, under authority of the Clean Air Act section 111(d), issued the Affordable Clean Energy (ACE) rule which provides guidance to states on establishing emissions performance standards for coal-fired electric generating units (EGUs). Under this rule, states are required to submit plans to the EPA which demonstrate the use of specifically listed retrofit technologies and operating practices to achieve carbon dioxide reduction though heat rate improvement (HRI). HRI is a measurement of power plant efficiency that EPA determined as part of this rulemaking to be the best system of emissions reduction for carbon dioxide generated from coal fired EGUs (EPA 2019).

4.1.2 State

Statewide GHG Emission Targets and the Climate Change Scoping Plan

California's 2017 Climate Change Scoping Plan (2017 Scoping Plan), prepared by CARB, outlines the main strategies California will implement to achieve the legislated GHG emission target for 2030 and "substantially advance toward our 2050 climate goals" (CARB 2017:1, 3, 5, 20, 25–26). It identifies the reductions needed by each GHG emission sector (e.g., transportation, industry, electricity generation, agriculture, commercial and residential, pollutants with high global warming potential, and recycling and waste). CARB and other State agencies also released the 2030 Draft Natural and Working Lands Climate Change Implementation Plan consistent with the carbon neutrality goal of Executive Order B-55-18. The Plan furthers the State's goals through improving the carbon sequestration potential of the State's natural and working lands through improved soil health and forest management strategies.

The State has also passed more detailed legislation addressing GHG emissions associated with industrial sources, transportation, electricity generation, and energy consumption, as summarized below.

Cap-and-Trade Program

CARB administers the State's cap-and-trade program, which covers GHG emission sources that emit more than 25,000 metric tons of CO_2 equivalent per year ($MTCO_2e$/year), such as refineries, power plants, and

industrial facilities. This market-based approach to reducing GHG emissions provides economic incentives for achieving GHG emission reductions.

Transportation-Related Standards and Regulations

As part of its Advanced Clean Cars program, CARB established more stringent GHG emission standards and fuel efficiency standards for fossil fuel–powered on-road vehicles. In addition, the program's zero-emission vehicle regulation requires battery, fuel cell, and plug-in hybrid electric vehicles to account for up to 15 percent of California's new vehicle sales by 2025 (CARB 2016b:15). By 2025, when the rules will be fully implemented, GHG emissions from the statewide fleet of new cars and light-duty trucks will be reduced by 34 percent and cars will emit 75 percent less smog-forming pollution than the statewide fleet in 2016 (CARB 2016c:1).

Executive Order B-48-18, signed into law in January 2018, requires all State entities to work with the private sector to have at least 5 million zero-emission vehicles on the road by 2030, as well as 200 hydrogen fueling stations and 250,000 electric vehicle–charging stations installed by 2025. It specifies that 10,000 of these charging stations must be direct-current fast chargers.

Legislation Associated with Electricity Generation

The State has passed legislation requiring the increasing use of renewables to produce electricity for consumers. California utilities are required to generate 33 percent of their electricity from renewables by 2020 (SB X1-2 of 2011); 52 percent by 2027 (SB 100 of 2018); 60 percent by 2030 (also SB 100 of 2018); and 100 percent by 2045 (also SB 100 of 2018).

Building Energy Efficiency Standards (Title 24, Part 6)

The current California Energy Code (2016) is scheduled to be replaced by the 2019 standards on January 1, 2020. The 2019 California Energy Code will require builders to use more energy-efficient building technologies for compliance with increased restrictions on allowable energy use. Additionally, new residential units will be required to include solar panels, sized to offset the estimated electrical requirements of each unit (CCR, Title 24, Part 6, Section 150.1[c]14). CEC estimates that the combination of required energy-efficiency features and mandatory solar panels in the 2019 California Energy Code will result in new residential buildings that use 53 percent less energy than those designed to meet the 2016 California Energy Code. CEC also estimates that the 2019 California Energy Code will result in new commercial buildings that use 30 percent less energy than those designed to meet the 2016 standards, primarily through the transition to high-efficiency lighting (CEC 2018).

4.2 ENVIRONMENTAL SETTING

4.2.1 Greenhouse Gas Emissions and Climate Change

PHYSICAL SCIENTIFIC BASIS OF GREENHOUSE GAS AND CLIMATE CHANGE

Certain gases in the earth's atmosphere, classified as GHGs, play a critical role in determining the earth's surface temperature. Solar radiation enters the atmosphere from space. A portion of the radiation is absorbed by the earth's surface, and a smaller portion of this radiation is reflected toward space. The absorbed radiation is then emitted from the earth as low-frequency infrared radiation. The frequencies at which bodies emit radiation are proportional to temperature. The earth has a much lower temperature than the sun; therefore, the earth emits lower frequency radiation. Most solar radiation passes through GHGs; however, infrared radiation is absorbed by these gases. As a result, radiation that otherwise would have escaped back into space is instead "trapped," resulting in a warming of the atmosphere. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate on earth.

Prominent GHGs contributing to the greenhouse effect are CO_2, methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Human-generated emissions of these GHGs in excess of natural ambient concentrations are found to be responsible for intensifying the greenhouse effect and leading to a trend of unnatural warming of the earth's climate, known as global climate change or global warming. It is "extremely likely" that more than half of the observed increase in global average surface temperature from 1951 to 2010 was caused by the anthropomorphic increase in GHG concentrations and other anthropomorphic forcing (IPCC 2014:5). This warming is observable considering the 20 hottest years ever recorded occurred within the past thirty years (McKibben 2018).

Climate change is a global problem. GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants, which are pollutants of regional and local concern. Whereas most pollutants with localized air quality effects have relatively short atmospheric lifetimes (approximately one day), GHGs have long atmospheric lifetimes (one year to several thousand years). GHGs persist in the atmosphere long enough to be dispersed around the globe. Although the lifetime of any GHG molecule depends on multiple variables and cannot be determined with perfect certainty, it is understood that more CO_2 is emitted into the atmosphere than is sequestered by ocean uptake, vegetation, and other forms of sequestration. Of the total annual human-caused CO_2 emissions, approximately 55 percent are estimated to be sequestered through ocean and land uptake every year, averaged over the last 50 years, whereas the remaining 45 percent of human-caused CO_2 emissions remain stored in the atmosphere (IPCC 2013:467).

The quantity of GHGs in the atmosphere responsible for climate change is not precisely known, but it is enormous. No single project alone would measurably contribute to an incremental change in the global average temperature or to global or local climates or microclimates. From the standpoint of CEQA, GHG impacts relative to global climate change are inherently cumulative.

GREENHOUSE GAS EMISSION SOURCES AND SINKS

As discussed previously, GHG emissions are attributable in large part to human activities. CO_2 is the main byproduct of fossil fuel combustion. Methane, a highly potent GHG, primarily results from off-gassing (the release of chemicals from nonmetallic substances under ambient or greater pressure conditions) and is largely associated with agricultural practices, organic material decomposition in landfills, and the burning of forest fires (Black et al. 2017). Nitrous oxide emissions are largely attributable to agricultural practices and soil management. CO_2 sinks, or reservoirs, include vegetation and the ocean, which absorb CO_2 through sequestration and dissolution (CO_2 dissolving into the water); respectively, these are the two of the most common processes for removing CO_2 from the atmosphere.

The total GHG inventory for California in 2016 was 429 million metric tons of CO_2 equivalents ($MMTCO_2e$) (California Air Resources Board [CARB] 2018a). This is less than the 2020 target of 431 $MMTCO_2e$ equal to the inventory for 1990 (CARB 2018b:1). Table 8 summarizes the statewide GHG inventory for California.

Table 8 Statewide GHG Emissions by Economic Sector

Sector	Percent
Transportation	41
Industrial	23
Electricity generation (in state)	10
Electricity generation (imports)	6
Agriculture	8
Residential	7
Commercial	5
Not specified	<1

Source: CARB 2018a

EFFECTS OF CLIMATE CHANGE ON THE ENVIRONMENT

According to the Intergovernmental Panel on Climate Change (IPCC), which was established in 1988 by the World Meteorological Organization and the United Nations Environment Programme, global average temperature will increase by 1.5 degrees Celsius (°C) (2.7 degrees Fahrenheit [°F]) by 2040. This 1.5 warming represents a global average indicating that portions of the earth will experience more dramatic warming than others. Oceans, which supports high specific heat, will experience less dramatic warming as compared to continents, particularly in inland regions.

According to *California's Fourth Climate Change Assessment*, if global GHGs are reduced at a moderate rate, California will experience average daily high temperatures that are warmer than the historic average by 2.5 °F from 2006 to 2039, by 4.4 °F from 2040 to 2069, and by 5.6 °F from 2070 to 2100; and if GHG emissions continue at current rates then California will experience average daily high temperatures that are warmer than the historic average by 2.7 °F from 2006 to 2039, by 5.8 °F from 2040 to 2069, and by 8.8 °F from 2070 to 2100 (Governor's Office of Planning and Research [OPR] 2019:23). The potential effects of this warming in California are well documented.

Since its previous climate change assessment in 2012, California has experienced several of the most extreme natural events in its recorded history: a severe drought from 2012-2016, an almost non-existent Sierra Nevada winter snowpack in 2014-2015, increasingly large and severe wildfires, and back-to-back years of the warmest average temperatures (OPR 2019:56). According to CNRA's *Safeguarding California Plan: 2018 Update*, California experienced the driest 4-year statewide precipitation on record from 2012 through 2015; the warmest years on average in 2014, 2015, and 2016; and the smallest and second smallest Sierra snowpack on record in 2015 and 2014 (CNRA 2018:55). In contrast, the northern Sierra Nevada experienced its wettest year on record during the 2016—2017 water year (CNRA 2018:64). The changes in precipitation exacerbate wildfires throughout California through a cycle of high vegetative growth coupled with dry, hot periods which lowers the moisture content of fuel loads. As a result, the frequency, size, and devastation of forest fires increases. In November 2018, the Camp Fire completely destroyed the town of Paradise in Butte County and caused 85 fatalities, becoming the State's deadliest fire in recorded history. Moreover, changes in the intensity of precipitation events following wildfires can also result in devastating landslides. In January 2018 following the Thomas Fire, 0.5 inches of rain fell over just 5 minutes in Santa Barbara causing destructive mudslides formed from the debris and loose soil left behind by the fire. These mudslides resulted in 21 deaths.

As temperatures increase, the amount of precipitation falling as rain rather than snow also increases, which could lead to increased flooding because water that would normally be held in the snowpack of the Sierra Nevada and Cascade Range until spring would flow into the Central Valley during winter rainstorm events. This scenario would place more pressure on California's levee/flood control system (CNRA 2018:190–192).

Temperature increases and changes to historical precipitation patterns will likely affect ecologically productivity. Existing habitats may migrate from climatic changes where possible, and those that lack the ability to retreat will be severely threatened. Altered climatic conditions dramatically endangers the survival of arthropods which could have cascading effects throughout ecosystems (Lister and Garcia 2018). Conversely, a warming climate may support the populations of other insects such as ticks and mosquitos, which transmit diseases harmful to human health such as the Zika virus, West Nile virus, and Lyme disease (European Commission Joint Research Centre 2018).

Changes in temperature, precipitation patterns, extreme weather events, wildfires, and sea-level rise have the potential to threaten transportation and energy infrastructure, crop production, forests and rangelands, and public health (CNRA 2018:64, 116–117, 127; OPR 2019:63). The effects of climate change will also have an indirect adverse impact on the economy as more severe natural disasters cause expensive, physical damage to communities and the State. Additionally, adjusting to the physical changes associated with climate change can produce mental health impacts such as depression and anxiety.

Cal-Adapt is a climate change scenario planning tool developed by the California Energy Commission (CEC) that downscales global climate model data to local and regional resolution under two emissions scenarios. The Representative Concentration Pathway (RCP) 8.5 scenario represents a business-as-usual future emissions scenario, and the RCP 4.5 scenario represents a future with reduced GHG emissions. According to Cal-Adapt, annual average maximum temperatures in the project area are projected to rise by 5.9°F to 10.9°F by 2099, with the low and high ends of the range reflecting the lower and higher emissions increase scenarios (CEC 2019). Annual average minimum temperatures are expected to rise within a similar range.

The project area experienced an annual average high temperature of 73.3°F between 1961 and 1990. Under the RCP 4.5 scenario, the county's annual average high temperature is projected to increase by 5.2°F to 78.5°F by 2050 and increase an additional 0.7°F to 79.2°F by 2099 (CEC 2019). Under the RCP 8.5 scenario, the county's annual average high temperature is projected to increase by 5.6°F to 78.9°F by 2050 and increase an additional 5.0°F to 83.9°F by 2099 (CEC 2019). The project area experienced an average precipitation of 24.2 inches per year between 1961 and 1990. Under the RCP 4.5 scenario, the county is projected to experience an increase of 9.2 inches to 33.4 inches per year by 2050 and decrease to 25.6 inches per year by 2099 (CEC 2019). Under the RCP 8.5 scenario, the project area is projected to experience an increase of 14.5 inches to 28.7 inches per year by 2050 and decrease to 28.7 inches per year by 2099 (CEC 2019).

4.3 IMPACTS AND MITIGATION MEASURES

4.3.1 Methodology

The City of Murrieta's GPU and CAP Update are consistent with State legislation and guidance and would achieve GHG reduction targets consistent with the reduction goals set forth by Assembly Bill (AB) 32, Senate Bill (SB) 32, Executive Order (EO) B-30-15, and EO S-3-05. The emissions inventory and targets developed in the CAP Update are based on the following State reduction targets and goals: 1990 levels by 2020 (AB 32); 40 percent below 1990 levels by 2030 (SB 32); and 80 percent below 1990 levels by 2050 (EO S-3-05).

The necessary data are not available to estimate the City's 1990 emission level. Therefore, a baseline year of 2016 has been designated because it is the year with the most available data. Proportional targets for the baseline inventory were developed to express the level of GHG emissions reductions that would be needed locally between 2016 and future target years to demonstrate consistency with statewide targets. Thus, in order to stay consistent with the State's targets and to account for the City's 2016 inventory, the City's percent-based GHG reduction targets are matched with the state-level reduction targets relative to a 2016 baseline. According to the inventories available from CARB, statewide emissions from all sectors were approximately 431 million $MTCO_2e$ ($MMTCO_2e$) in 1990 and 429 $MMTCO_2e$ in 2016 (CARB 2018). Thus, 2016 Statewide emissions were 2 $MMTCO_2e$ (0.37 percent) less than the 1990 level and the State's 2020 GHG target. Consequently, no further reductions from 2016 emissions levels are needed to reach the 2020 target of returning emissions to 1990 levels. To be consistent with the GPU's 2035 build out year, a target was established based on interpolation of the 2030 and 2050 targets. The City's GHG reduction targets are as follows:

- 2020 target: no reductions required;
- 2030 target: 40 percent below 2016 levels; and
- 2035 target: 50 percent below 2016 levels.

A potentially significant impact would result if the City's future emissions under implementation of the GPU and CAP Update would achieve the City's reduction targets for 2030 and 2035.

4.3.2 CAP Update GHG Reduction Measures

The CAP Update provides a list of local GHG reduction measures that would be implemented to further reduce GHG emissions from State and federal legislation actions to meet the City's 2030 and 2035 reduction targets. None of the proposed measures indicate where specific improvements would be constructed, their size, or specific characteristics. Consistent with the requirements of the CEQA Guidelines Section 15168, this memo provides a program-level discussion of the potential general impacts of implementing these measures, rather than project-level or site-specific physical impacts of such actions. Table 9 shows the GHG reductions attributable to the measures in the CAP Update and how anticipated reductions will help the City close the gap in emissions to meet its 2030 and 2035 targets. It also shows the City's progress in achieving its fair-share of emissions reductions toward the State's 2050 goal.

Table 9 City of Murrieta CAP Update GHG Reduction Measures

Measure #	Sector	Measure Title	Description	GHG Reductions (MT CO_2e)		
				2030	2035	2050
BE-1	Building Energy	Community Renewable Energy	The City shall create or join a Community Choice Aggregation (CCA) program or create a partnership with SoCal Edison's off-site renewable energy programs (i.e., Green Rate Program), which allows building renters and owners to opt into cleaner electricity sources.	28,306	22,210	0
BE-2	Building Energy	Municipal Renewable Energy	Develop renewable energy generation systems on City-owned property for use in municipal operations.	26	39	0
BE-3	Building Energy	Zero Net Energy Standard	Adopt a Zero Net Energy standards for development by 2025 and implement it through the following phased approach: ◢ Begin phase-in of standards in 2025 by applying, where feasible, to residential, commercial, and industrial projects ◢ Full phase-in of standards for residential and commercial uses by 2030, requiring all new residential and commercial projects to comply ◢ Full phase-in of standards for industrial uses by 2035, requiring all new industrial uses to comply	24,659	50,094	113,303
BE-4	Building Energy	Energy Efficiency and Electrification Program	Work with WRCOG's Western Riverside Energy Partnership to develop and implement a comprehensive electrification and energy efficiency retrofit program focused on the reduction of natural gas use in existing residential and commercial land uses. The program would include the goal of reducing natural gas in existing residential and nonresidential land uses 20% by 2030. - The program would include but not limited to strategies focused on reductions from: • Pool-related energy use (e.g., pool cover rebate program) • Electrification retrofits for natural gas appliances in existing residential and commercial land uses (i.e., hot water heaters, cooktops, heating systems)	33,664	50,800	79,757
LU-1	Land Use	Jobs-Housing Balance Strategy	Encourage flexibility in land use regulations to respond to requirements of new and emerging business and industry types to help create sustainable jobs-housing balance.	10,373	10,418	12,261
LU-2	Land Use	Tree Planting Program	Develop a tree planting program to plant trees throughout the City to increase carbon sequestration.	6,301	12,956	19,612

LU-3	Land Use	Open Space Conservation	Work with the Western Riverside Regional Conservation Authority (RCA) and the Center for Natural Lands Management to implement land use conservation programs for the City. The program would include a minimum acreage of land preserved through conservation easements and, therefore, would not be permitted for future development.	16,095	18,240	20,385
T-1	Transportation	EV Programs	Increase electric vehicles and alternative fuel vehicles to 21.5% of the City's vehicle mix by 2030 and 23% by 2035 by incentivizing EV purchases and promoting EV ownership for residents and businesses.	86,188	87,335	120,574
T-2	Transportation	EV Programs	Adopt an electric vehicle (EV) charging station ordinance that requires the following for new development: - Installation of one EV charger per single-family housing unit; and - Six percent of total parking spaces require EV charger infrastructure installation for new multi-family projects - Three percent of total parking spaces require EV charger installation for new nonresidential projects	See T-1	See T-1	See T-1
T-3	Transportation	TOD Affordable Housing Program	Prioritize mixed-use and transit-oriented affordable housing projects to achieve the City's affordable housing targets in the SCAG Regional Housing Needs Assessment.	5,036	5,572	7,670
T-4	Transportation	Murrieta Bike Network	Increase the City's bike and pedestrian infrastructure, including implementing the Downtown Murrieta Bike Network, developing comprehensive bike parking standards, and increasing the total percentage of City streets that include bike lanes throughout the City.	367	120	0
T-5	Transportation	Traffic Signalization	Improve traffic flow and reduce traffic congestion by implementing a comprehensive traffic signalization synchronization and update.	1,213	1,265	1,500
T-6	Transportation	Traffic Calming Program	Implement a traffic calming measure program to increase the percentage of City streets and intersections with calming traffic measures.	890	929	3,306
T-7	Transportation	Transportation Demand Management Program	Implement a Citywide TDM Program to reduce communitywide VMT 1. Update Development Code to require employers with 50 or more employees to implement commute trip reduction programs. Commute Trip Reduction Programs voluntary for employees include: - Alternative modes of commuting incentive program (e.g., walking, biking, etc.); - Ride-sharing and preferential parking; - Discounted transit fee program; or - Telecommuting or alternative work schedules 2. Implement a comprehensive ridesharing program targeted at residents working in neighboring cities and long-distance commuters (i.e., San Diego, Los Angeles). 3. Monitor progress annually on TDM program to measure progress towards achieving a nine percent reduction in VMT by 2030 and an 11 percent reduction by 2035.	8,954	11,416	18,373
T-8	Transportation	Transit Network	Work with RTA and WRCOG to expand the transit network in the City and increase service frequency with a priority on expanding services to neighboring cities where Murrieta residents work.	10,391	21,555	25,145
T-9	Transportation	GHG Reduction Program	Develop and implement a no-net-increase in GHG emissions threshold for new development projects in the City and develop a GHG Fee Program to offset remaining GHG emissions from new development that cannot be	41,357	76,481	108,756

			achieved through project design features or other CAP measures. As part of implementation of this measure, the City shall: - Adopt a set of strategies to reduce GHG emissions from new development through project-specific mitigation measures (See Implementation Descriptions below for suggestion of potential strategies.) - Develop a process in which the remainder of emissions that cannot be reduced through project-specific measures shall be quantified and offset through a combination of a local emissions offset program to be set up by the City and other offset registry programs (See Implementation Descriptions below for a description of the local emissions offset program.)			
SW-1	Solid Waste	Zero Emissions Vehicle Program	Encourage recycling or the re-use of materials to reduce the amount of solid waste generated within the City with the goal of achieving a 90% waste diversion rate by 2035.	4,583	7,215	11,120
SW-2	Solid Waste	Construction Waste Diversion	Require all construction projects to exceed CALGreen construction waste diversion requirements by 15 percent.	998	827	686
WW-1	Water	Landscaping and Water Conservation Program	Reduce outdoor water use by 10% at residential, commercial, and public properties by installing efficient irrigation systems and plants with lower watering needs.	55	44	0
WW-2	Water	Rainwater Catchment Program	Encourage property owners to recycle water with rainwater catchment and greywater systems in existing and new developments.	5	4	0
TOTAL				279,463	377,521	542,447

Notes: $MTCO_2e$ = metric tons of carbon dioxide equivalent.
Source: Ascent Environmental 2019.

4.3.3 Thresholds of Significance

The issue of climate change is inherently a cumulative issue, as the GHG emissions of individual projects cannot be shown to have any material effect on global climate. Thus, the project's impact to climate change is addressed only as a cumulative impact.

CEQA Guidelines Section 15064 and relevant portions of Appendix G recommend that a lead agency consider a project's consistency with relevant, adopted plans, and discuss any inconsistencies with applicable regional plans, including plans to reduce GHG emissions. In Appendix G of the State CEQA Guidelines, two checklist questions are provided to help assess if a project would result in a potentially significant impact on climate change. These questions ask whether the project would:

- generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, or
- conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs?

In California, some counties, cities, and air districts have developed guidance and thresholds of significance for determining significance of GHG emissions that occur within their jurisdiction. The City of Murrieta is the CEQA Lead Agency for the project and is, therefore, responsible for determining whether an impact would be considered significant. This analysis relies on the project's consistency with State GHG reduction targets to assess the significance of its GHG emissions impacts.

4.3.4 Project Impacts

Impact GHG-1 Project-Generated GHG Emissions

The GPU is a policy-level document that does not include any site-specific designs or proposals or grant any entitlements for development; however, construction and operation of GHG emission reduction measures provided in the CAP Update to offset emissions have the potential to directly or indirectly emit GHG emissions. GHG emissions would result from the operation of construction equipment, construction worker vehicle trips, and truck hauling trips. During the operational phase, some measures may require additional staffing, resulting in increased vehicle trips and associated GHG emissions. The following section describes the GHG emissions that could result from the implementation of the CAP Update.

Transportation Measures

GHG reduction measures that could result in the construction of new EV charging stations; enhanced transit network, and pedestrian and bicycle improvements (T-1 – T-9) would result in GHG emissions from construction equipment and vehicle trips. Construction activities may include grading, land clearing, construction of new structures, and paving. Operational emissions associated with these improvements would be minimal and generated by occasional use of maintenance equipment. Furthermore, these measures would encourage a shift towards alternative modes of transportation, reduce single-occupancy vehicle trips, resulting in an overall reduction in citywide GHG emissions.

Building Energy Measures

GHG reduction measures that could result in construction of renewable energy systems or efficiency improvements (BE-1 – BE-4) would result in minor GHG emissions from construction equipment and vehicle trips. Maintenance activities would be minimal and could consist of occasional inspections. Operational associated GHG emissions would be minimal from the occasional use of maintenance equipment or vehicles. Thus, these measures would not be expected to result in substantial GHG emissions. Furthermore, any temporary GHG emissions would be offset by the by the overall net benefit of GHG emission reductions during the operation of the small-scale renewable energy systems and through energy conservation.

Waste Diversion and Water Use Reduction Measures

GHG reduction measures for water use reductions would result in nominal construction emissions from vehicle trips for the installation of irrigation and rainwater catchment systems (WW-1 – WW-2). Operational emissions would not occur from waste diversion measures or water use reductions as haul trips would be reduced and water use efficiency and recycling will be increased.

Land Use Measures

GHG reduction measures related to land use, such as Measure LU-2, would result in the installation of City trees. This measure would result in minor GHG emissions from equipment and vehicle trips. Tree installation would not require heavy equipment but could result in a small amount of GHG emissions due to distribution of trees and watering at the beginning of the establishment period. Any emissions associated with this improvement would be minimal and temporary and would not generate substantial GHG emissions. The preservation of open space would preserve the carbon sequestration benefits of open space and habitat, thereby contributing to lower emissions. Improving jobs-housing balance would reduce the rate of vehicle miles traveled by increasing use of transit, walking, biking, and alternatives to driving alone, and decreasing the distance of drive-alone trips, which in turn would contribute to overall GHG reductions.

Summary

Implementation of the CAP Update would reduce emissions generated from implementation the GPU by increasing use of electric and other zero emission vehicles, reducing VMT, increasing renewable electricity use and energy efficiency, reducing waste and water use, and increasing carbon sequestration. The emissions generated from the measure's construction and operations activities is nominal compared to the long-term GHG emission reduction benefits. As described in detail in the CAP Update, the City would achieve its GHG reduction targets for 2030 and 2035. Impact GHG-1 would be less than significant for the proposed project, consistent with the less than significant impact identified in the 2011 General Plan EIR. The project would not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.

Impact GHG-2 Plan Conflict

The project would have a significant impact if it would conflict with established statewide GHG emission reduction targets established by AB 32, SB 32, EO S-3-05, and CARB's 2017 Scoping Plan.

The CAP Update primarily focuses on reducing emissions by 2030 and 2035, and also establishes a 2050 goal, which is important to guide long-term planning. The 2030 target aligns with the State's target codified in SB 32 and the 2035 target aligns with the horizon year of the GPU. To estimate the City's emissions for target years 2030, 2035, and 2050, emissions were evaluated based on whether they would change over time with and without legislative action to reduce emissions. The business-as-usual (BAU) emissions scenario is one in which no action is taken by local, State or federal agencies to reduce GHG emissions. The second scenario, a legislative-adjusted business-as-usual (ABAU), is one in which BAU conditions are adjusted to reflect policy or regulatory actions enacted by State or federal agencies, but without considering any local actions to reduce GHG emissions. The legislative actions applied to the BAU include renewable energy standards, building energy efficiency, waste and water use reductions, and State and federal vehicle efficiency standards. A complete list of legislative reductions applied to the BAU scenario are provided in Chapter 2 of the CAP Update.

Table 10 summarizes the forecasted GHG emissions under both a BAU and ABAU scenario. As indicated in Table 10, after implementation of State, federal, and CAP Update GHG reductions actions, to the CAP Update would meet the 2030 and 2035 targets while making progress towards the 2050 target. Therefore, the project's emissions are consistent with statewide goals and CARB's 2017 Scoping Plan.

Table 10 City of Murrieta Emissions Forecasts (MT CO_2e)

	2016	2020	2030	2035[a]	2050
BAU Forecast	890,575	953,569	1,122,275	1,213,537	1,560,442
Percent Change from 2016		7%	26%	36%	75%
ABAU Forecast	N/A	878,357	815,174	820,787	875,589
Percent Change from 2016		-1%	-8%	-8%	-2%
State Reduction Target (percent change from 2016)		-2%[b]	40%	50%	80%
Target Emissions		N/A	536,836	447,363	178,945
Reductions Needed from ABAU Forecast		5,594	278,338	373,424	696,644
Total Reductions from Measures		N/A	279,463	377,521	542,447

Notes: ABAU = legislative-adjusted business-as-usual, BAU = business-as-usual, CO_2e = carbon dioxide equivalents, N/A = Not Available, MT = metric tons

a. Interpolated between 2030 and 2050.

b. Based on the State's GHG inventory in 1990 and 2016. (CARB 2018a).

Achieving a 2050 goal in a local government CAP is considerably challenging due to the extended time horizon, uncertainty about the future and the City's limited jurisdiction over various sources of emissions. Furthermore, the California Air Resources Board's (CARB) 2017 Climate Change Scoping Plan (2017 Scoping Plan), which lays out the framework for achieving the 2030 target established by SB 32, does not demonstrate a feasible pathway for the State to achieve its 2050 goal at this time. It is technically possible to calculate the scale of emissions reductions at a local level to achieve a 2050 goal, but it is not feasible or meaningful to analyze how a local government can substantially achieve a 2050 target based on local actions alone and therefore, it is difficult to establish defensible reduction assumptions beyond a 15-year time frame. This is primarily because of uncertainty around future technological advances and future changes in State and federal law and a local government's relatively limited jurisdiction over numerous emissions sources and activities that affect emissions.

In the coming decades, new innovations and technologies could become available that will enable further GHG reductions beyond 2035 on the path to achieving the long-term 2050 goal. New or more reliable methods may also become available to quantify measures that are currently unquantifiable. Future laws or regulations may further reduce emissions in sectors currently outside of the jurisdiction of the City (e.g., new vehicle emissions standards that would apply to new or replacement vehicles decades into the future), or emissions in sectors currently addressed primarily by local measures. As climate change science and policy continues to change, the City will be able to reevaluate how these and other factors are affecting progress toward meeting the long-term 2050 GHG emissions reduction goal in future CAP updates.

The following section compares the CAP Update GHG reduction measures to existing plans, policies, and regulations adopted for the purpose of reducing GHG emissions.

Transportation Measures

GHG reduction measures that could result in new EV charging stations, an enhanced transit network, and pedestrian and bicycle improvements would be consistent with the City's overall goals to reduce GHG emissions which are also consistent with statewide targets. These measures would also support transportation and land use strategies outlined in the GPU.

Building Energy Measures

GHG reduction measures that could result in renewable energy systems or efficiency improvements (BE-1 – BE-4) would be consistent with the City's overall goal to reduce GHG emissions which is also consistent with statewide targets. These measures would also support SB X1-2, SB 100, and the California Energy Code.

Waste Diversion and Water Use Reduction Measures

GHG reduction measures that could result in waste diversion and water use reductions would be consistent with the City's overall goal to reduce GHG emissions which is also consistent with statewide targets and the California Energy Code.

Land Use Measures

GHG Reduction Measure LU-2 and LU-3 would increase carbon sequestration with the increase of vegetation within the city. This would be consistent with the City's overall goal to reduce GHG emissions which is also consistent with statewide targets. These measures would also support the GPU.

Summary

Implementation of the proposed project would achieve the City's GHG reduction targets for 2030 and 2035, which are in alignment with the State's reduction targets and goals as expressed in the 2017 Scoping Plan; implementation of the proposed project would make substantial progress toward achievement by 2050 of reductions in line with the State's goals. The GHG reduction measures of the CAP Update would not conflict with any State plans, policies, or regulations adopted for the purpose of reducing GHG emissions. Impact GHG-2 would be less than significant for the project, consistent with the less than significant impact identified in the 2011 General Plan EIR. The project would not result in a new significant impact or a substantial increase in the severity of the previously identified significant impact.

Cumulative Impacts

The discussion of GHG emissions associated with the project for Impact GHG-1 and GHG-2 are inherently a cumulative impact analysis. GHG emissions from one project cannot, on their own, result in changes in climatic conditions; therefore, the emissions from one project must be considered in the context of their contribution to cumulative global emissions. The analysis of Impact GHG-1 concluded that the level of construction- and operation-related GHG emissions associated with implementation of the project would be less than significant. Impact GHG-2 concluded that the project would not conflict with the State's ability to meet its GHG targets with the implementation of the CAP Update and GHG emission reduction measures identified in Table 9 and, therefore, would be less than significant. The proposed project's impacts would not represent a cumulatively considerable contribution to climate change. The project would have a less than significant cumulative impact, consistent with the impact conclusion identified in the 2011 General Plan EIR. The project would not result in a new significant cumulative impact or a substantial increase in the severity of the previously identified significant cumulative impact.

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Attachment A

Air Quality Modeling

CalEEMod Input Calculations Output

Land Use

	2011 GP		2035 GP Update		Difference (2011-2035)	
	DU	SF	DU	SF	DU	SF
Large Lot Residential	939		908	-	-31	-
Single Family Residential	30,338		30,146	-	-192	-
Multi-Family Residential	12,318		14,115	-	1,797	-
Innovation	-		-	7,259,396	-	7,259,396
Commercial	4	17,655,112	4	17,831,861	0	176,749
Office and Research Park	20	15,921,136	20	6,079,482	0	-9,841,654
Business Park	-	9,999,285	-	9,999,285	-	0
Industrial	-	2,585,303	-	2,585,303	-	0
Civic Insitutional	-	1,391,585	-	1,391,494	-	-91
Parks and Open Space	-	16,508	-	16,508	-	0
Mixed Use	731	1,195,844	731	1,195,844	0	0
Roads	-	-	-	-	-	-
TOTAL	**44,350**	**48,764,773**	**45,924**	**46,359,173**	**1,574**	**-2,405,600**
1000 SF						-2,406

REFERENCE

Table 2-1
2011 General Plan 2035 Land Use Summary[1]

Land Use Designation	Acres	Density Standard (du/ac)	Intensity Standard (FAR)	2035 Estimated Buildout	
				DU	SF
Large Lot Residential	3,030.62	0.4 - 1.0		939	
Single-Family Residential	6,255.31	1.1 - 10.0		30,338	
Multiple-Family Residential	661.56	10.1 – 30.0		12,318	
Commercial	1,266.58		0.25 – 0.75	4	17,655,112
Office and Research Park	1,353.70		0.6 -2.5	20	15,921,136
Business Park	717.35		0.4 – 0.6		9,999,285
Industrial	185.47		0.4 – 0.5		2,585,303
Civic and Institutional	1,064.88		0.5 – 1.0		1,391,585
Parks and Open Space	3,474.46				16,508
Mixed Use	59.68	30	1	731	1,195,844
Roads	3,441.07				
TOTAL CITY ONLY	**21,510.68**			**44,351**	**48,764,774**
Sphere of Influence	5,340.95				
TOTAL WITH SPHERE OF INFLUENCE	**26,851.63**				

Notes:
1. This table summarizes the projected buildout of the 2011 General Plan based on existing 2018 land use designations by acre.
2. du/ac = dwelling units per acre
3. FAR = Floor Area Ratio

Table 2.2
Proposed General Plan 2035 Land Use Summary

Land Use Designation	Acres	Density Standard (du/ac)	Intensity Standard (FAR)	2035 Estimated Buildout	
				DU	SF
Large Lot Residential	2,927.44	0.4 - 1.0		908	
Single-Family Residential	6,215.73	1.1 - 10.0		30,146	
Multiple-Family Residential	758.03	10.1 – 30.0		14,115	
Innovation	520.79		0.6 - 2.5		7,259,396
Commercial	1,279.26		0.25 – 0.75	4	17,831,861
Office and Research Park	516.91		0.6 -2.5	20	6,079,482
Business Park	717.35		0.4 – 0.6		9,999,285
Industrial	185.47		0.4 – 0.5		2,585,303
Civic and Institutional	1,064.81		0.5 – 1.0		1,391,494
Parks and Open Space	3,824.14				16,508
Mixed Use	59.68	30	1	731	1,195,844
Roads	3,441.07				
TOTAL CITY ONLY	**21,510.68**			**45,923**	**46,359,173**
Sphere of Influence	5,340.95				
TOTAL WITH SPHERE OF INFLUENCE	**26,851.63**				

Notes:
This table summarizes the proposed draft General Plan buildout. Buildout calculations described in this table are estimates.

VMT

Interpolation

	2016	2035	2040
Daily VMT	4,132,700	5,444,776	5,854,532

2016-2040 Compound Annual Growth Rate
0.01461769

Source: VRPA Vehicle Miles Traveled (VMT) Analysis

Exhibit 1
Total Daily Citywide VMT

	Adopted	Proposed	Net 2035
Daily VMT	5,588,834	5,495,806	-93,028

Source: VRPA Vehicle Miles Traveled (VMT) Analysis

Forcasting Calculation
Annual VMT

Adopted	Proposed	Net 2035
1,939,325,398	1,907,044,682	-32,280,716

REFERENCE

Exhibit 1
Total Daily Citywide Vehicle Miles Traveled (VMT)

Analysis Year	Scenario		
	Existing (Adopted) General Plan	Proposed General Plan Update	Net Change
2016 (Base)	4,136,700	4,132,649	-4,051
2020 (Interpolated)	4,442,413	4,419,630	-22,783
2030 (Interpolated)	5,206,697	5,137,080	-69,617
2035 (Interpolated)	5,588,834	5,495,806	-93,028
2040 (Interpolated)	5,970,980	5,854,532	-116,448

Note: VMT totals calculated using origin-destination method

CalEEMod Default VMT Calculator (UNMITIGATED SCENARIO)

This calcultor was created based on the default trip inputs for the unmitigated CalEEMod run. The calculator calculateds the annual VMT from the proposed project using the same methodology from CalEEMod, described in Appendix A, for the UNMITIGATED SCENARIO. This calculator can be used to adjust land use trip rates for the MITIGATED PROJECT scenario which is based on the traffic study conducted for the project

Trip Type

CalEEMod defaults based on land uses inputted

Land Use	Miles			Trip %			Trip Purpose		
	H-w or C-W	H-S or C-C	H-O or C-O	H-w or C-W	H-S or C-C	H-O or C-O	Primary	Diverted	Pass-by
Government Office Building	14.70	5.90	8.70	40.2%	19.2%	40.6%	86.0%	11.0%	3.0%

Total Trips

Total Trips = (TripRate weekday x 5 +Trip Sat + Trip Sun)

Average Daily Trips Based on CalEEMod Trip Gen Defaults per land use unit. Total trips Calculated

Land Use	Average Daily Trip Rate			
	weekday	Saturday	Sunday	Total Trips (weekly)
Government Office Building	6.65	6.39	5.86	**45.5**
	18.9			
	35%	**34%**	**31%**	**100%**

Trip Length Calc

AVG Trip Length = Link % primary x trip length primary+link % divertedx0.25x length trip primary+link % passbyx0.1

Trip length calculated for each trip type based on trip purpose % and length defaults from CalEEMod

Land Use

Government Office Building	link % primary	trip length primary	link % diverted	Constant (0.25)	trip length primary	link % passby	constant	Trip Length
H-W or c-w	86.0%	14.70	11.0%	0.25	14.7	3.0%	0.1	13.0
h-s or c-c	86.0%	5.90	11.0%	0.25	5.9	3.0%	0.1	5.2
h-o or c-o	86.0%	8.70	11.0%	0.25	8.7	3.0%	0.1	7.7

VMT Calc Per Land Use Type (Weekly)

VMT = #Trips x AVG Trip Length per land use and trip type

Trip number for each trip type are derived by multiplying the total trips for each land use calculated above in the Total Trip Calcs by the trip % shown in the Trip Type table for each land use

Government Office Building	**# trips**	**trip length**	**Weekly VMT**	**Annual VMT**
H-W or c-w	18	13.0	239	
h-s or c-c	9	5.2	46	
h-o or c-o	18	7.7	143	
Total VMT			427	22,211.49

Annual VMT Calc

the calculated weekly VMT for each land use is summed. This value is multiplied by 50 weeks/year to equal the annual VMT number calculated by CalEEMod

Summed Weekly VMT from Each Land Use	427.14			
Weeks per Year CalEEMod Uses for Annual VMT	52.00		52.0000	52.14285714
Calculated Annual VMT	**22,211**	22,211		

CalEEMod Existing VMT Calculator (MITIGATED SCENARIO)

This calcultor was created based on the default trip inputs for the unmitigated CalEEMod run. The calculator calculateds the annual VMT from the proposed project using the same methodology from CalEEMod, described in Appendix A, for the MITIGATED SCENARIO. This calculator can be used to adjust land use trip rates for the MITIGATED PROJECT scenario which is based on the traffic study conducted for the project

Daily VMT Provided by VRPA **5,588,834**

Annual VMT **1,939,325,398**

Trip Type

CalEEMod defaults based on land uses inputted

Land Use	Miles			Trip %			Trip Purpose		
	H-w or C-W	H-S or C-C	H-O or C-O	H-w or C-W	H-S or C-C	H-O or C-O	Primary	Diverted	Pass-by
Residential	14.70	5.90	8.70	40.2%	19.2%	40.6%	86.0%	11.0%	3.0%

Total Trips

Total Trips = (TripRate weekday x 5 +Trip Sat + Trip Sun)

Average Daily Trips Based on CalEEMod Trip Gen Defaults per land use unit. Total trips Calculated

Land Use	Average Daily Trip Rate			
	weekday	Saturday	Sunday	Total Trips (weekly)
Residential	1,650,193	0	0	**8250967.05**

Land Use	Average Daily Trip Rate Proportioned			
	weekday	Saturday	Sunday	Total Trips (weekly)
Residential	580,623.61	557,922.53	511,647.27	**3972687.839**

Land Use	Average Daily Trip Rate per DU			
	weekday	Saturday	Sunday	Total Trips (weekly)
Residential	369.35	354.91	325.48	**2527.155114**

Trip Length Calc

AVG Trip Length = Link % primary x trip length primary+link % divertedx0.25x length trip primary+link % passbyx0.1

Trip length calculated for each trip type based on trip purpose % and length defaults from CalEEMod

Land Use

Residential	link % primary	trip length primary	link % diverted	Constant (0.25)	trip length primary	link % passby	constant	Trip Length
H-W or c-w	86.0%	14.70	11.0%	0.25	14.7	3.0%	0.1	13.0
h-s or c-c	86.0%	5.90	11.0%	0.25	5.9	3.0%	0.1	5.2
h-o or c-o	86.0%	8.70	11.0%	0.25	8.7	3.0%	0.1	7.7

VMT Calc Per Land Use Type (Weekly)

VMT = #Trips x AVG Trip Length per land use and trip type

Trip number for each trip type are derived by multiplying the total trips for each land use calculated above in the Total Trip Calcs by the trip % shown in the Trip Type table for

Residential	**# trips**	**trip length**	**Weekly VMT**	**Annual VMT**
H-W or c-w	1,597,021	13.0	20,839,920	
h-s or c-c	762,756	5.2	3,996,270	
h-o or c-o	1,612,911	7.7	12,458,530	
Total VMT			37,294,719	1,939,325,410.89

Annual VMT Calc

the calculated weekly VMT for each land use is summed. This value is multiplied by 50 weeks/year to equal the annual VMT number calculated by CalEEMod

Summed Weekly VMT from Each Land Use	37,294,719.44			
Weeks per Year CalEEMod Uses for Annual VMT	52.00		52.0000	52.14285714
Calculated Annual VMT	**1,939,325,411**	1,939,325,411		
		12.89		
	32,265,184			

CalEEMod Proposed VMT Calculator (MITIGATED SCENARIO)

This calcultor was created based on the default trip inputs for the unmitigated CalEEMod run. The calculator calculateds the annual VMT from the proposed project using the same methodology from CalEEMod, described in Appendix A, for the MITIGATED SCENARIO. This calculator can be used to adjust land use trip rates for the MITIGATED PROJECT scenario which is based on the traffic study conducted for the project

Daily VMT Provided by VRPA **5,495,806**

Annual VMT **1,907,044,682**

Trip Type

CalEEMod defaults based on land uses inputted

Land Use	Miles			Trip %			Trip Purpose		
	H-w or C-W	H-S or C-C	H-O or C-O	H-w or C-W	H-S or C-C	H-O or C-O	Primary	Diverted	Pass-by
Residential	14.70	5.90	8.70	40.2%	19.2%	40.6%	86.0%	11.0%	3.0%

Total Trips

Total Trips = (TripRate weekday x 5 +Trip Sat + Trip Sun)

Average Daily Trips Based on CalEEMod Trip Gen Defaults per land use unit. Total trips Calculated

Land Use	Average Daily Trip Rate			
	weekday	Saturday	Sunday	Total Trips (weekly)
Residential	1,622,725	0	0	**8113627**

Land Use	Average Daily Trip Rate Proportioned			
	weekday	Saturday	Sunday	Total Trips (weekly)
Residential	570,958.94	548,635.73	503,130.73	**3906561.148**

Land Use	Average Daily Trip Rate per DU			
	weekday	Saturday	Sunday	Total Trips (weekly)
Residential	363.21	349.00	320.06	**2485.089789**

Trip Length Calc

AVG Trip Length = Link % primary x trip length primary+link % divertedx0.25x length trip primary+link % passbyx0.1

Trip length calculated for each trip type based on trip purpose % and length defaults from CalEEMod

Land Use

Residential	link % primary	trip length primary	link % diverted	Constant (0.25)	trip length primary	link % passby	constant	Trip Length
H-W or c-w	86.0%	14.70	11.0%	0.25	14.7	3.0%	0.1	13.0
h-s or c-c	86.0%	5.90	11.0%	0.25	5.9	3.0%	0.1	5.2
h-o or c-o	86.0%	8.70	11.0%	0.25	8.7	3.0%	0.1	7.7

VMT Calc Per Land Use Type (Weekly)

VMT = #Trips x AVG Trip Length per land use and trip type

Trip number for each trip type are derived by multiplying the total trips for each land use calculated above in the Total Trip Calcs by the trip % shown in the Trip Type table for

Residential	**# trips**	**trip length**	**Weekly VMT**	**Annual VMT**
H-W or c-w	1,570,438	13.0	20,493,033	
h-s or c-c	750,060	5.2	3,929,750	
h-o or c-o	1,586,064	7.7	12,251,154	
Total VMT			36,673,937	1,907,044,704.00

Annual VMT Calc

the calculated weekly VMT for each land use is summed. This value is multiplied by 50 weeks/year to equal the annual VMT number calculated by CalEEMod

Summed Weekly VMT from Each Land Use	36,673,936.62			
Weeks per Year CalEEMod Uses for Annual VMT	52.00		52.0000	52.14285714
Calculated Annual VMT	**1,907,044,704**	1,907,044,704		
		22.00		
	(15,532)			

Residential Operations CalEEMod Output

City of Murrieta General Plan Update - Residential

Riverside-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments Mid Rise	1,572.00	Dwelling Unit	41.37	1,572,000.00	4496

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2035
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - GP Update will add 1,572 multi-family dwelling units.

Construction Phase -

Vehicle Trips - On-road transportation analyzed in seperate CalEEMod run

Woodstoves - No woodstoves or fireplaces

Energy Mitigation - Increased efficiency to meet 2019 Title 24 Standards

Table Name	Column Name	Default Value	New Value
tblFireplaces	NumberGas	1,336.20	0.00

tblFireplaces	NumberNoFireplace	157.20	0.00
tblFireplaces	NumberWood	78.60	0.00
tblVehicleTrips	HO_TTP	40.60	0.00
tblVehicleTrips	HS_TTP	19.20	0.00
tblVehicleTrips	HW_TTP	40.20	0.00
tblVehicleTrips	ST_TR	6.39	0.00
tblVehicleTrips	SU_TR	5.86	0.00
tblVehicleTrips	WD_TR	6.65	0.00
tblWoodstoves	NumberCatalytic	78.60	0.00
tblWoodstoves	NumberNoncatalytic	78.60	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2020	0.7345	5.5095	5.2797	0.0139	1.3340	0.2252	1.5592	0.4810	0.2090	0.6900	0.0000	1,254.1257	1,254.1257	0.1685	0.0000	1,258.3371
2021	0.9337	4.7460	7.2068	0.0236	1.7622	0.1387	1.9009	0.4711	0.1303	0.6014	0.0000	2,150.2307	2,150.2307	0.1443	0.0000	2,153.8386
2022	0.8616	4.3311	6.7598	0.0230	1.7554	0.1179	1.8733	0.4693	0.1108	0.5801	0.0000	2,089.7914	2,089.7914	0.1381	0.0000	2,093.2431
2023	5.3201	1.9038	3.3691	0.0109	0.8290	0.0602	0.8892	0.2215	0.0564	0.2779	0.0000	990.3622	990.3622	0.0735	0.0000	992.2000
Maximum	**5.3201**	**5.5095**	**7.2068**	**0.0236**	**1.7622**	**0.2252**	**1.9009**	**0.4810**	**0.2090**	**0.6900**	**0.0000**	**2,150.2307**	**2,150.2307**	**0.1685**	**0.0000**	**2,153.8386**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2020	0.7345	5.5095	5.2797	0.0139	1.3340	0.2252	1.5592	0.4810	0.2090	0.6900	0.0000	1,254.1252	1,254.1252	0.1685	0.0000	1,258.3365
2021	0.9337	4.7459	7.2068	0.0236	1.7622	0.1387	1.9009	0.4711	0.1303	0.6014	0.0000	2,150.2303	2,150.2303	0.1443	0.0000	2,153.8383
2022	0.8616	4.3311	6.7598	0.0230	1.7554	0.1179	1.8733	0.4693	0.1108	0.5801	0.0000	2,089.7911	2,089.7911	0.1381	0.0000	2,093.2427
2023	5.3201	1.9038	3.3691	0.0109	0.8290	0.0602	0.8892	0.2215	0.0564	0.2779	0.0000	990.3619	990.3619	0.0735	0.0000	992.1998
Maximum	**5.3201**	**5.5095**	**7.2068**	**0.0236**	**1.7622**	**0.2252**	**1.9009**	**0.4810**	**0.2090**	**0.6900**	**0.0000**	**2,150.2303**	**2,150.2303**	**0.1685**	**0.0000**	**2,153.8383**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**1-1-2020**	**3-31-2020**	1.2657	1.2657
2	**4-1-2020**	**6-30-2020**	1.7200	1.7200
3	**7-1-2020**	**9-30-2020**	1.6669	1.6669
4	**10-1-2020**	**12-31-2020**	1.5824	1.5824
5	**1-1-2021**	**3-31-2021**	1.4011	1.4011
6	**4-1-2021**	**6-30-2021**	1.4201	1.4201
7	**7-1-2021**	**9-30-2021**	1.4357	1.4357
8	**10-1-2021**	**12-31-2021**	1.4323	1.4323
9	**1-1-2022**	**3-31-2022**	1.2863	1.2863
10	**4-1-2022**	**6-30-2022**	1.3041	1.3041
11	**7-1-2022**	**9-30-2022**	1.3184	1.3184
12	**10-1-2022**	**12-31-2022**	1.3148	1.3148
13	**1-1-2023**	**3-31-2023**	1.1040	1.1040

14	**4-1-2023**	**6-30-2023**	0.9215	0.9215
15	**7-1-2023**	**9-30-2023**	2.7461	2.7461
		Highest	2.7461	2.7461

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	6.6553	0.1864	16.1545	8.6000e-004		0.0899	0.0899		0.0899	0.0899	0.0000	26.4812	26.4812	0.0252	0.0000	27.1114
Energy	0.1254	1.0716	0.4560	6.8400e-003		0.0866	0.0866		0.0866	0.0866	0.0000	3,528.8865	3,528.8865	0.1182	0.0423	3,544.4462
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	146.7868	0.0000	146.7868	8.6749	0.0000	363.6582
Water						0.0000	0.0000		0.0000	0.0000	32.4938	653.4978	685.9916	3.3644	0.0844	795.2487
Total	**6.7807**	**1.2580**	**16.6105**	**7.7000e-003**	**0.0000**	**0.1765**	**0.1765**	**0.0000**	**0.1765**	**0.1765**	**179.2807**	**4,208.8655**	**4,388.1461**	**12.1827**	**0.1267**	**4,730.4645**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	6.6553	0.1864	16.1545	8.6000e-004		0.0899	0.0899		0.0899	0.0899	0.0000	26.4812	26.4812	0.0252	0.0000	27.1114
Energy	0.0860	0.7352	0.3128	4.6900e-003		0.0594	0.0594		0.0594	0.0594	0.0000	2,934.2480	2,934.2480	0.1023	0.0334	2,946.7589

Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	146.7868	0.0000	146.7868	8.6749	0.0000	363.6582
Water						0.0000	0.0000		0.0000	0.0000	32.4938	653.4978	685.9916	3.3644	0.0844	795.2487
Total	**6.7413**	**0.9215**	**16.4674**	**5.5500e-003**	**0.0000**	**0.1493**	**0.1493**	**0.0000**	**0.1493**	**0.1493**	**179.2807**	**3,614.2270**	**3,793.5077**	**12.1668**	**0.1178**	**4,132.7772**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.58**	**26.75**	**0.86**	**27.92**	**0.00**	**15.41**	**15.41**	**0.00**	**15.41**	**15.41**	**0.00**	**14.13**	**13.55**	**0.13**	**7.02**	**12.63**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2020	3/10/2020	5	50	
2	Site Preparation	Site Preparation	3/11/2020	4/21/2020	5	30	
3	Grading	Grading	4/22/2020	8/4/2020	5	75	
4	Building Construction	Building Construction	8/5/2020	6/6/2023	5	740	
5	Paving	Paving	6/7/2023	8/22/2023	5	55	
6	Architectural Coating	Architectural Coating	8/23/2023	11/7/2023	5	55	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 187.5

Acres of Paving: 0

Residential Indoor: 3,183,300; Residential Outdoor: 1,061,100; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38

Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	1,132.00	168.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	226.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0828	0.8300	0.5438	9.7000e-004		0.0415	0.0415		0.0386	0.0386	0.0000	84.9965	84.9965	0.0240	0.0000	85.5964
Total	**0.0828**	**0.8300**	**0.5438**	**9.7000e-004**		**0.0415**	**0.0415**		**0.0386**	**0.0386**	**0.0000**	**84.9965**	**84.9965**	**0.0240**	**0.0000**	**85.5964**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.7200e-003	1.2100e-003	0.0129	4.0000e-005	4.1200e-003	3.0000e-005	4.1500e-003	1.0900e-003	2.0000e-005	1.1200e-003	0.0000	3.4485	3.4485	9.0000e-005	0.0000	3.4506
Total	**1.7200e-003**	**1.2100e-003**	**0.0129**	**4.0000e-005**	**4.1200e-003**	**3.0000e-005**	**4.1500e-003**	**1.0900e-003**	**2.0000e-005**	**1.1200e-003**	**0.0000**	**3.4485**	**3.4485**	**9.0000e-005**	**0.0000**	**3.4506**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0828	0.8300	0.5438	9.7000e-004		0.0415	0.0415		0.0386	0.0386	0.0000	84.9964	84.9964	0.0240	0.0000	85.5963
Total	**0.0828**	**0.8300**	**0.5438**	**9.7000e-004**		**0.0415**	**0.0415**		**0.0386**	**0.0386**	**0.0000**	**84.9964**	**84.9964**	**0.0240**	**0.0000**	**85.5963**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.7200e-003	1.2100e-003	0.0129	4.0000e-005	4.1200e-003	3.0000e-005	4.1500e-003	1.0900e-003	2.0000e-005	1.1200e-003	0.0000	3.4485	3.4485	9.0000e-005	0.0000	3.4506
Total	**1.7200e-003**	**1.2100e-003**	**0.0129**	**4.0000e-005**	**4.1200e-003**	**3.0000e-005**	**4.1500e-003**	**1.0900e-003**	**2.0000e-005**	**1.1200e-003**	**0.0000**	**3.4485**	**3.4485**	**9.0000e-005**	**0.0000**	**3.4506**

3.3 Site Preparation - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2710	0.0000	0.2710	0.1490	0.0000	0.1490	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Off-Road	0.0612	0.6363	0.3227	5.7000e-004		0.0330	0.0330		0.0303	0.0303	0.0000	50.1460	50.1460	0.0162	0.0000	50.5515
Total	**0.0612**	**0.6363**	**0.3227**	**5.7000e-004**	**0.2710**	**0.0330**	**0.3040**	**0.1490**	**0.0303**	**0.1793**	**0.0000**	**50.1460**	**50.1460**	**0.0162**	**0.0000**	**50.5515**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2400e-003	8.7000e-004	9.2800e-003	3.0000e-005	2.9700e-003	2.0000e-005	2.9900e-003	7.9000e-004	2.0000e-005	8.0000e-004	0.0000	2.4829	2.4829	6.0000e-005	0.0000	2.4845
Total	**1.2400e-003**	**8.7000e-004**	**9.2800e-003**	**3.0000e-005**	**2.9700e-003**	**2.0000e-005**	**2.9900e-003**	**7.9000e-004**	**2.0000e-005**	**8.0000e-004**	**0.0000**	**2.4829**	**2.4829**	**6.0000e-005**	**0.0000**	**2.4845**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2710	0.0000	0.2710	0.1490	0.0000	0.1490	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0612	0.6363	0.3227	5.7000e-004		0.0330	0.0330		0.0303	0.0303	0.0000	50.1460	50.1460	0.0162	0.0000	50.5514
Total	**0.0612**	**0.6363**	**0.3227**	**5.7000e-004**	**0.2710**	**0.0330**	**0.3040**	**0.1490**	**0.0303**	**0.1793**	**0.0000**	**50.1460**	**50.1460**	**0.0162**	**0.0000**	**50.5514**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2400e-003	8.7000e-004	9.2800e-003	3.0000e-005	2.9700e-003	2.0000e-005	2.9900e-003	7.9000e-004	2.0000e-005	8.0000e-004	0.0000	2.4829	2.4829	6.0000e-005	0.0000	2.4845
Total	**1.2400e-003**	**8.7000e-004**	**9.2800e-003**	**3.0000e-005**	**2.9700e-003**	**2.0000e-005**	**2.9900e-003**	**7.9000e-004**	**2.0000e-005**	**8.0000e-004**	**0.0000**	**2.4829**	**2.4829**	**6.0000e-005**	**0.0000**	**2.4845**

3.4 Grading - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3253	0.0000	0.3253	0.1349	0.0000	0.1349	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1669	1.8824	1.1984	2.3300e-003		0.0815	0.0815		0.0750	0.0750	0.0000	204.3161	204.3161	0.0661	0.0000	205.9681
Total	**0.1669**	**1.8824**	**1.1984**	**2.3300e-003**	**0.3253**	**0.0815**	**0.4068**	**0.1349**	**0.0750**	**0.2099**	**0.0000**	**204.3161**	**204.3161**	**0.0661**	**0.0000**	**205.9681**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.4500e-003	2.4200e-003	0.0258	8.0000e-005	8.2400e-003	5.0000e-005	8.2900e-003	2.1900e-003	5.0000e-005	2.2400e-003	0.0000	6.8969	6.8969	1.7000e-004	0.0000	6.9013
Total	**3.4500e-003**	**2.4200e-003**	**0.0258**	**8.0000e-005**	**8.2400e-003**	**5.0000e-005**	**8.2900e-003**	**2.1900e-003**	**5.0000e-005**	**2.2400e-003**	**0.0000**	**6.8969**	**6.8969**	**1.7000e-004**	**0.0000**	**6.9013**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3253	0.0000	0.3253	0.1349	0.0000	0.1349	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1669	1.8824	1.1984	2.3300e-003		0.0815	0.0815		0.0750	0.0750	0.0000	204.3159	204.3159	0.0661	0.0000	205.9679
Total	**0.1669**	**1.8824**	**1.1984**	**2.3300e-003**	**0.3253**	**0.0815**	**0.4068**	**0.1349**	**0.0750**	**0.2099**	**0.0000**	**204.3159**	**204.3159**	**0.0661**	**0.0000**	**205.9679**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Worker	3.4500e-003	2.4200e-003	0.0258	8.0000e-005	8.2400e-003	5.0000e-005	8.2900e-003	2.1900e-003	5.0000e-005	2.2400e-003	0.0000	6.8969	6.8969	1.7000e-004	0.0000	6.9013
Total	**3.4500e-003**	**2.4200e-003**	**0.0258**	**8.0000e-005**	**8.2400e-003**	**5.0000e-005**	**8.2900e-003**	**2.1900e-003**	**5.0000e-005**	**2.2400e-003**	**0.0000**	**6.8969**	**6.8969**	**1.7000e-004**	**0.0000**	**6.9013**

3.5 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1134	1.0265	0.9014	1.4400e-003		0.0598	0.0598		0.0562	0.0562	0.0000	123.9113	123.9113	0.0302	0.0000	124.6671
Total	**0.1134**	**1.0265**	**0.9014**	**1.4400e-003**		**0.0598**	**0.0598**		**0.0562**	**0.0562**	**0.0000**	**123.9113**	**123.9113**	**0.0302**	**0.0000**	**124.6671**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0255	0.9349	0.1829	2.3100e-003	0.0568	5.2900e-003	0.0621	0.0164	5.0600e-003	0.0214	0.0000	221.0038	221.0038	0.0177	0.0000	221.4455
Worker	0.2784	0.1950	2.0824	6.1600e-003	0.6657	4.1000e-003	0.6698	0.1768	3.7700e-003	0.1805	0.0000	556.9236	556.9236	0.0140	0.0000	557.2722
Total	**0.3039**	**1.1299**	**2.2653**	**8.4700e-003**	**0.7224**	**9.3900e-003**	**0.7318**	**0.1931**	**8.8300e-003**	**0.2020**	**0.0000**	**777.9274**	**777.9274**	**0.0316**	**0.0000**	**778.7177**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1134	1.0265	0.9014	1.4400e-003		0.0598	0.0598		0.0562	0.0562	0.0000	123.9112	123.9112	0.0302	0.0000	124.6669
Total	**0.1134**	**1.0265**	**0.9014**	**1.4400e-003**		**0.0598**	**0.0598**		**0.0562**	**0.0562**	**0.0000**	**123.9112**	**123.9112**	**0.0302**	**0.0000**	**124.6669**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0255	0.9349	0.1829	2.3100e-003	0.0568	5.2900e-003	0.0621	0.0164	5.0600e-003	0.0214	0.0000	221.0038	221.0038	0.0177	0.0000	221.4455
Worker	0.2784	0.1950	2.0824	6.1600e-003	0.6657	4.1000e-003	0.6698	0.1768	3.7700e-003	0.1805	0.0000	556.9236	556.9236	0.0140	0.0000	557.2722
Total	**0.3039**	**1.1299**	**2.2653**	**8.4700e-003**	**0.7224**	**9.3900e-003**	**0.7318**	**0.1931**	**8.8300e-003**	**0.2020**	**0.0000**	**777.9274**	**777.9274**	**0.0316**	**0.0000**	**778.7177**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Off-Road	0.2481	2.2749	2.1631	3.5100e-003		0.1251	0.1251		0.1176	0.1176	0.0000	302.2867	302.2867	0.0729	0.0000	304.1099
Total	**0.2481**	**2.2749**	**2.1631**	**3.5100e-003**		**0.1251**	**0.1251**		**0.1176**	**0.1176**	**0.0000**	**302.2867**	**302.2867**	**0.0729**	**0.0000**	**304.1099**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0523	2.0443	0.3933	5.5900e-003	0.1385	3.9100e-003	0.1424	0.0400	3.7400e-003	0.0437	0.0000	534.8868	534.8868	0.0408	0.0000	535.9069
Worker	0.6334	0.4268	4.6505	0.0145	1.6237	9.7300e-003	1.6334	0.4312	8.9600e-003	0.4401	0.0000	1,313.0572	1,313.0572	0.0306	0.0000	1,313.8218
Total	**0.6857**	**2.4711**	**5.0438**	**0.0201**	**1.7622**	**0.0136**	**1.7758**	**0.4711**	**0.0127**	**0.4838**	**0.0000**	**1,847.9440**	**1,847.9440**	**0.0714**	**0.0000**	**1,849.7288**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2481	2.2749	2.1631	3.5100e-003		0.1251	0.1251		0.1176	0.1176	0.0000	302.2863	302.2863	0.0729	0.0000	304.1095
Total	**0.2481**	**2.2749**	**2.1631**	**3.5100e-003**		**0.1251**	**0.1251**		**0.1176**	**0.1176**	**0.0000**	**302.2863**	**302.2863**	**0.0729**	**0.0000**	**304.1095**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0523	2.0443	0.3933	5.5900e-003	0.1385	3.9100e-003	0.1424	0.0400	3.7400e-003	0.0437	0.0000	534.8868	534.8868	0.0408	0.0000	535.9069
Worker	0.6334	0.4268	4.6505	0.0145	1.6237	9.7300e-003	1.6334	0.4312	8.9600e-003	0.4401	0.0000	1,313.0572	1,313.0572	0.0306	0.0000	1,313.8218
Total	**0.6857**	**2.4711**	**5.0438**	**0.0201**	**1.7622**	**0.0136**	**1.7758**	**0.4711**	**0.0127**	**0.4838**	**0.0000**	**1,847.9440**	**1,847.9440**	**0.0714**	**0.0000**	**1,849.7288**

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2218	2.0300	2.1272	3.5000e-003		0.1052	0.1052		0.0990	0.0990	0.0000	301.2428	301.2428	0.0722	0.0000	303.0471
Total	**0.2218**	**2.0300**	**2.1272**	**3.5000e-003**		**0.1052**	**0.1052**		**0.0990**	**0.0990**	**0.0000**	**301.2428**	**301.2428**	**0.0722**	**0.0000**	**303.0471**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0486	1.9185	0.3649	5.5200e-003	0.1379	3.2800e-003	0.1412	0.0398	3.1300e-003	0.0429	0.0000	528.2540	528.2540	0.0385	0.0000	529.2168
Worker	0.5912	0.3825	4.2676	0.0139	1.6175	9.4400e-003	1.6269	0.4295	8.6900e-003	0.4382	0.0000	1,260.2946	1,260.2946	0.0274	0.0000	1,260.9792
Total	**0.6398**	**2.3011**	**4.6326**	**0.0195**	**1.7554**	**0.0127**	**1.7681**	**0.4693**	**0.0118**	**0.4811**	**0.0000**	**1,788.5486**	**1,788.5486**	**0.0659**	**0.0000**	**1,790.1960**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2218	2.0300	2.1272	3.5000e-003		0.1052	0.1052		0.0990	0.0990	0.0000	301.2425	301.2425	0.0722	0.0000	303.0467
Total	**0.2218**	**2.0300**	**2.1272**	**3.5000e-003**		**0.1052**	**0.1052**		**0.0990**	**0.0990**	**0.0000**	**301.2425**	**301.2425**	**0.0722**	**0.0000**	**303.0467**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0486	1.9185	0.3649	5.5200e-003	0.1379	3.2800e-003	0.1412	0.0398	3.1300e-003	0.0429	0.0000	528.2540	528.2540	0.0385	0.0000	529.2168
Worker	0.5912	0.3825	4.2676	0.0139	1.6175	9.4400e-003	1.6269	0.4295	8.6900e-003	0.4382	0.0000	1,260.2946	1,260.2946	0.0274	0.0000	1,260.9792
Total	**0.6398**	**2.3011**	**4.6326**	**0.0195**	**1.7554**	**0.0127**	**1.7681**	**0.4693**	**0.0118**	**0.4811**	**0.0000**	**1,788.5486**	**1,788.5486**	**0.0659**	**0.0000**	**1,790.1960**

3.5 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0881	0.8056	0.9097	1.5100e-003		0.0392	0.0392		0.0369	0.0369	0.0000	129.8107	129.8107	0.0309	0.0000	130.5827
Total	**0.0881**	**0.8056**	**0.9097**	**1.5100e-003**		**0.0392**	**0.0392**		**0.0369**	**0.0369**	**0.0000**	**129.8107**	**129.8107**	**0.0309**	**0.0000**	**130.5827**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0160	0.6181	0.1369	2.3100e-003	0.0594	6.3000e-004	0.0600	0.0171	6.0000e-004	0.0177	0.0000	221.5603	221.5603	0.0127	0.0000	221.8777
Worker	0.2392	0.1485	1.6945	5.7700e-003	0.6968	3.9700e-003	0.7007	0.1850	3.6500e-003	0.1887	0.0000	522.2914	522.2914	0.0106	0.0000	522.5564

Total	**0.2552**	**0.7666**	**1.8314**	**8.0800e-003**	**0.7562**	**4.6000e-003**	**0.7608**	**0.2022**	**4.2500e-003**	**0.2064**	**0.0000**	**743.8517**	**743.8517**	**0.0233**	**0.0000**	**744.4341**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0881	0.8056	0.9097	1.5100e-003		0.0392	0.0392		0.0369	0.0369	0.0000	129.8105	129.8105	0.0309	0.0000	130.5825
Total	**0.0881**	**0.8056**	**0.9097**	**1.5100e-003**		**0.0392**	**0.0392**		**0.0369**	**0.0369**	**0.0000**	**129.8105**	**129.8105**	**0.0309**	**0.0000**	**130.5825**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0160	0.6181	0.1369	2.3100e-003	0.0594	6.3000e-004	0.0600	0.0171	6.0000e-004	0.0177	0.0000	221.5603	221.5603	0.0127	0.0000	221.8777
Worker	0.2392	0.1485	1.6945	5.7700e-003	0.6968	3.9700e-003	0.7007	0.1850	3.6500e-003	0.1887	0.0000	522.2914	522.2914	0.0106	0.0000	522.5564
Total	**0.2552**	**0.7666**	**1.8314**	**8.0800e-003**	**0.7562**	**4.6000e-003**	**0.7608**	**0.2022**	**4.2500e-003**	**0.2064**	**0.0000**	**743.8517**	**743.8517**	**0.0233**	**0.0000**	**744.4341**

3.6 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0284	0.2803	0.4011	6.3000e-004		0.0140	0.0140		0.0129	0.0129	0.0000	55.0739	55.0739	0.0178	0.0000	55.5192
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0284**	**0.2803**	**0.4011**	**6.3000e-004**		**0.0140**	**0.0140**		**0.0129**	**0.0129**	**0.0000**	**55.0739**	**55.0739**	**0.0178**	**0.0000**	**55.5192**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5600e-003	9.7000e-004	0.0110	4.0000e-005	4.5300e-003	3.0000e-005	4.5600e-003	1.2000e-003	2.0000e-005	1.2300e-003	0.0000	3.3986	3.3986	7.0000e-005	0.0000	3.4003
Total	**1.5600e-003**	**9.7000e-004**	**0.0110**	**4.0000e-005**	**4.5300e-003**	**3.0000e-005**	**4.5600e-003**	**1.2000e-003**	**2.0000e-005**	**1.2300e-003**	**0.0000**	**3.3986**	**3.3986**	**7.0000e-005**	**0.0000**	**3.4003**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Off-Road	0.0284	0.2803	0.4011	6.3000e-004		0.0140	0.0140		0.0129	0.0129	0.0000	55.0738	55.0738	0.0178	0.0000	55.5191
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0284**	**0.2803**	**0.4011**	**6.3000e-004**		**0.0140**	**0.0140**		**0.0129**	**0.0129**	**0.0000**	**55.0738**	**55.0738**	**0.0178**	**0.0000**	**55.5191**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5600e-003	9.7000e-004	0.0110	4.0000e-005	4.5300e-003	3.0000e-005	4.5600e-003	1.2000e-003	2.0000e-005	1.2300e-003	0.0000	3.3986	3.3986	7.0000e-005	0.0000	3.4003
Total	**1.5600e-003**	**9.7000e-004**	**0.0110**	**4.0000e-005**	**4.5300e-003**	**3.0000e-005**	**4.5600e-003**	**1.2000e-003**	**2.0000e-005**	**1.2300e-003**	**0.0000**	**3.3986**	**3.3986**	**7.0000e-005**	**0.0000**	**3.4003**

3.7 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	4.9182					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.2700e-003	0.0358	0.0498	8.0000e-005		1.9500e-003	1.9500e-003		1.9500e-003	1.9500e-003	0.0000	7.0215	7.0215	4.2000e-004	0.0000	7.0320
Total	**4.9235**	**0.0358**	**0.0498**	**8.0000e-005**		**1.9500e-003**	**1.9500e-003**		**1.9500e-003**	**1.9500e-003**	**0.0000**	**7.0215**	**7.0215**	**4.2000e-004**	**0.0000**	**7.0320**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0235	0.0146	0.1661	5.7000e-004	0.0683	3.9000e-004	0.0687	0.0181	3.6000e-004	0.0185	0.0000	51.2059	51.2059	1.0400e-003	0.0000	51.2318
Total	**0.0235**	**0.0146**	**0.1661**	**5.7000e-004**	**0.0683**	**3.9000e-004**	**0.0687**	**0.0181**	**3.6000e-004**	**0.0185**	**0.0000**	**51.2059**	**51.2059**	**1.0400e-003**	**0.0000**	**51.2318**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	4.9182					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.2700e-003	0.0358	0.0498	8.0000e-005		1.9500e-003	1.9500e-003		1.9500e-003	1.9500e-003	0.0000	7.0214	7.0214	4.2000e-004	0.0000	7.0319
Total	**4.9235**	**0.0358**	**0.0498**	**8.0000e-005**		**1.9500e-003**	**1.9500e-003**		**1.9500e-003**	**1.9500e-003**	**0.0000**	**7.0214**	**7.0214**	**4.2000e-004**	**0.0000**	**7.0319**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0235	0.0146	0.1661	5.7000e-004	0.0683	3.9000e-004	0.0687	0.0181	3.6000e-004	0.0185	0.0000	51.2059	51.2059	1.0400e-003	0.0000	51.2318
Total	**0.0235**	**0.0146**	**0.1661**	**5.7000e-004**	**0.0683**	**3.9000e-004**	**0.0687**	**0.0181**	**3.6000e-004**	**0.0185**	**0.0000**	**51.2059**	**51.2059**	**1.0400e-003**	**0.0000**	**51.2318**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Mid Rise	14.70	5.90	8.70	0.00	0.00	0.00	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Mid Rise	0.565475	0.033834	0.192058	0.100675	0.009211	0.004032	0.016699	0.069908	0.001423	0.001062	0.004327	0.000756	0.000539

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	2,082.8598	2,082.8598	0.0860	0.0178	2,090.3113
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	2,287.8421	2,287.8421	0.0945	0.0195	2,296.0269
NaturalGas Mitigated	0.0860	0.7352	0.3128	4.6900e-003		0.0594	0.0594		0.0594	0.0594	0.0000	851.3882	851.3882	0.0163	0.0156	856.4476
NaturalGas Unmitigated	0.1254	1.0716	0.4560	6.8400e-003		0.0866	0.0866		0.0866	0.0866	0.0000	1,241.0444	1,241.0444	0.0238	0.0228	1,248.4193

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Mid Rise	2.32563e+007	0.1254	1.0716	0.4560	6.8400e-003		0.0866	0.0866		0.0866	0.0866	0.0000	1,241.0444	1,241.0444	0.0238	0.0228	1,248.4193
Total		**0.1254**	**1.0716**	**0.4560**	**6.8400e-003**		**0.0866**	**0.0866**		**0.0866**	**0.0866**	**0.0000**	**1,241.0444**	**1,241.0444**	**0.0238**	**0.0228**	**1,248.4193**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Mid Rise	1.59544e+007	0.0860	0.7352	0.3128	4.6900e-003		0.0594	0.0594		0.0594	0.0594	0.0000	851.3882	851.3882	0.0163	0.0156	856.4476
Total		**0.0860**	**0.7352**	**0.3128**	**4.6900e-003**		**0.0594**	**0.0594**		**0.0594**	**0.0594**	**0.0000**	**851.3882**	**851.3882**	**0.0163**	**0.0156**	**856.4476**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			

Apartments Mid Rise	7.18044e+006	2,287.8421	0.0945	0.0195	2,296.0269
Total		**2,287.8421**	**0.0945**	**0.0195**	**2,296.0269**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	6.5371e+006	2,082.8598	0.0860	0.0178	2,090.3113
Total		**2,082.8598**	**0.0860**	**0.0178**	**2,090.3113**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	6.6553	0.1864	16.1545	8.6000e-004		0.0899	0.0899		0.0899	0.0899	0.0000	26.4812	26.4812	0.0252	0.0000	27.1114
Unmitigated	6.6553	0.1864	16.1545	8.6000e-004		0.0899	0.0899		0.0899	0.0899	0.0000	26.4812	26.4812	0.0252	0.0000	27.1114

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.4918					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	5.6804					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.4830	0.1864	16.1545	8.6000e-004		0.0899	0.0899		0.0899	0.0899	0.0000	26.4812	26.4812	0.0252	0.0000	27.1114
Total	**6.6553**	**0.1864**	**16.1545**	**8.6000e-004**		**0.0899**	**0.0899**		**0.0899**	**0.0899**	**0.0000**	**26.4812**	**26.4812**	**0.0252**	**0.0000**	**27.1114**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.4918					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	5.6804					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.4830	0.1864	16.1545	8.6000e-004		0.0899	0.0899		0.0899	0.0899	0.0000	26.4812	26.4812	0.0252	0.0000	27.1114

Total	**6.6553**	**0.1864**	**16.1545**	**8.6000e-004**		**0.0899**	**0.0899**		**0.0899**	**0.0899**	**0.0000**	**26.4812**	**26.4812**	**0.0252**	**0.0000**	**27.1114**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	685.9916	3.3644	0.0844	795.2487
Unmitigated	685.9916	3.3644	0.0844	795.2487

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	102.422 / 64.5705	685.9916	3.3644	0.0844	795.2487
Total		**685.9916**	**3.3644**	**0.0844**	**795.2487**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	102.422 / 64.5705	685.9916	3.3644	0.0844	795.2487
Total		**685.9916**	**3.3644**	**0.0844**	**795.2487**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	146.7868	8.6749	0.0000	363.6582
Unmitigated	146.7868	8.6749	0.0000	363.6582

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	723.12	146.7868	8.6749	0.0000	363.6582
Total		**146.7868**	**8.6749**	**0.0000**	**363.6582**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	723.12	146.7868	8.6749	0.0000	363.6582
Total		**146.7868**	**8.6749**	**0.0000**	**363.6582**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

City of Murrieta General Plan Update - Residential

Riverside-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments Mid Rise	1,572.00	Dwelling Unit	41.37	1,572,000.00	4496

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2035
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - GP Update will add 1,572 multi-family dwelling units.

Construction Phase -

Vehicle Trips - On-road transportation analyzed in seperate CalEEMod run

Woodstoves - No woodstoves or fireplaces

Energy Mitigation - Increased efficiency to meet 2019 Title 24 Standards

Table Name	Column Name	Default Value	New Value
tblFireplaces	NumberGas	1,336.20	0.00

tblFireplaces	NumberNoFireplace	157.20	0.00
tblFireplaces	NumberWood	78.60	0.00
tblVehicleTrips	HO_TTP	40.60	0.00
tblVehicleTrips	HS_TTP	19.20	0.00
tblVehicleTrips	HW_TTP	40.20	0.00
tblVehicleTrips	ST_TR	6.39	0.00
tblVehicleTrips	SU_TR	5.86	0.00
tblVehicleTrips	WD_TR	6.65	0.00
tblWoodstoves	NumberCatalytic	78.60	0.00
tblWoodstoves	NumberNoncatalytic	78.60	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	8.3486	50.2577	65.6548	0.1960	18.2675	2.1986	20.4661	9.9840	2.0227	12.0068	0.0000	19,649.6807	19,649.6807	1.9481	0.0000	19,681.9185
2021	7.6599	36.0361	61.2003	0.1914	13.7289	1.0628	14.7916	3.6654	0.9982	4.6636	0.0000	19,196.9614	19,196.9614	1.2318	0.0000	19,227.7569
2022	7.0919	33.0348	57.5457	0.1866	13.7288	0.9065	14.6353	3.6654	0.8518	4.5171	0.0000	18,718.4537	18,718.4537	1.1811	0.0000	18,747.9819
2023	179.9749	27.8957	54.1433	0.1810	13.7288	0.7817	14.5105	3.6654	0.7343	4.3996	0.0000	18,156.9672	18,156.9672	1.0782	0.0000	18,183.9227

Maximum	**179.9749**	**50.2577**	**65.6548**	**0.1960**	**18.2675**	**2.1986**	**20.4661**	**9.9840**	**2.0227**	**12.0068**	**0.0000**	**19,649.6807**	**19,649.6807**	**1.9481**	**0.0000**	**19,681.9185**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	8.3486	50.2577	65.6548	0.1960	18.2675	2.1986	20.4661	9.9840	2.0227	12.0068	0.0000	19,649.6807	19,649.6807	1.9481	0.0000	19,681.9185
2021	7.6599	36.0361	61.2003	0.1914	13.7289	1.0628	14.7916	3.6654	0.9982	4.6636	0.0000	19,196.9614	19,196.9614	1.2318	0.0000	19,227.7569
2022	7.0919	33.0348	57.5457	0.1866	13.7288	0.9065	14.6353	3.6654	0.8518	4.5171	0.0000	18,718.4537	18,718.4537	1.1811	0.0000	18,747.9819
2023	179.9749	27.8957	54.1433	0.1810	13.7288	0.7817	14.5105	3.6654	0.7343	4.3996	0.0000	18,156.9672	18,156.9672	1.0782	0.0000	18,183.9227
Maximum	**179.9749**	**50.2577**	**65.6548**	**0.1960**	**18.2675**	**2.1986**	**20.4661**	**9.9840**	**2.0227**	**12.0068**	**0.0000**	**19,649.6807**	**19,649.6807**	**1.9481**	**0.0000**	**19,681.9185**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	37.6846	1.4910	129.2361	6.8500e-003		0.7192	0.7192		0.7192	0.7192	0.0000	233.5242	233.5242	0.2223	0.0000	239.0818
Energy	0.6871	5.8719	2.4987	0.0375		0.4748	0.4748		0.4748	0.4748		7,495.9851	7,495.9851	0.1437	0.1374	7,540.5300
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**38.3717**	**7.3629**	**131.7348**	**0.0443**	**0.0000**	**1.1940**	**1.1940**	**0.0000**	**1.1940**	**1.1940**	**0.0000**	**7,729.5093**	**7,729.5093**	**0.3660**	**0.1374**	**7,779.6118**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	37.6846	1.4910	129.2361	6.8500e-003		0.7192	0.7192		0.7192	0.7192	0.0000	233.5242	233.5242	0.2223	0.0000	239.0818
Energy	0.4714	4.0282	1.7142	0.0257		0.3257	0.3257		0.3257	0.3257		5,142.4377	5,142.4377	0.0986	0.0943	5,172.9966
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**38.1560**	**5.5193**	**130.9503**	**0.0326**	**0.0000**	**1.0449**	**1.0449**	**0.0000**	**1.0449**	**1.0449**	**0.0000**	**5,375.9619**	**5,375.9619**	**0.3209**	**0.0943**	**5,412.0784**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.56**	**25.04**	**0.60**	**26.55**	**0.00**	**12.48**	**12.48**	**0.00**	**12.48**	**12.48**	**0.00**	**30.45**	**30.45**	**12.33**	**31.40**	**30.43**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2020	3/10/2020	5	50	
2	Site Preparation	Site Preparation	3/11/2020	4/21/2020	5	30	
3	Grading	Grading	4/22/2020	8/4/2020	5	75	
4	Building Construction	Building Construction	8/5/2020	6/6/2023	5	740	
5	Paving	Paving	6/7/2023	8/22/2023	5	55	
6	Architectural Coating	Architectural Coating	8/23/2023	11/7/2023	5	55	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 187.5

Acres of Paving: 0

Residential Indoor: 3,183,300; Residential Outdoor: 1,061,100; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38

Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	1,132.00	168.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	226.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.3121	33.2010	21.7532	0.0388		1.6587	1.6587		1.5419	1.5419		3,747.7049	3,747.7049	1.0580		3,774.1536
Total	**3.3121**	**33.2010**	**21.7532**	**0.0388**		**1.6587**	**1.6587**		**1.5419**	**1.5419**		**3,747.7049**	**3,747.7049**	**1.0580**		**3,774.1536**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0763	0.0451	0.6048	1.6600e-003	0.1677	1.0200e-003	0.1687	0.0445	9.3000e-004	0.0454		165.2392	165.2392	4.2400e-003		165.3451
Total	**0.0763**	**0.0451**	**0.6048**	**1.6600e-003**	**0.1677**	**1.0200e-003**	**0.1687**	**0.0445**	**9.3000e-004**	**0.0454**		**165.2392**	**165.2392**	**4.2400e-003**		**165.3451**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.3121	33.2010	21.7532	0.0388		1.6587	1.6587		1.5419	1.5419	0.0000	3,747.7049	3,747.7049	1.0580		3,774.1536
Total	**3.3121**	**33.2010**	**21.7532**	**0.0388**		**1.6587**	**1.6587**		**1.5419**	**1.5419**	**0.0000**	**3,747.7049**	**3,747.7049**	**1.0580**		**3,774.1536**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0763	0.0451	0.6048	1.6600e-003	0.1677	1.0200e-003	0.1687	0.0445	9.3000e-004	0.0454		165.2392	165.2392	4.2400e-003		165.3451
Total	**0.0763**	**0.0451**	**0.6048**	**1.6600e-003**	**0.1677**	**1.0200e-003**	**0.1687**	**0.0445**	**9.3000e-004**	**0.0454**		**165.2392**	**165.2392**	**4.2400e-003**		**165.3451**

3.3 Site Preparation - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.0765	42.4173	21.5136	0.0380		2.1974	2.1974		2.0216	2.0216		3,685.1016	3,685.1016	1.1918		3,714.8975
Total	**4.0765**	**42.4173**	**21.5136**	**0.0380**	**18.0663**	**2.1974**	**20.2637**	**9.9307**	**2.0216**	**11.9523**		**3,685.1016**	**3,685.1016**	**1.1918**		**3,714.8975**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0916	0.0542	0.7258	1.9900e-003	0.2012	1.2200e-003	0.2024	0.0534	1.1200e-003	0.0545		198.2870	198.2870	5.0800e-003		198.4141
Total	**0.0916**	**0.0542**	**0.7258**	**1.9900e-003**	**0.2012**	**1.2200e-003**	**0.2024**	**0.0534**	**1.1200e-003**	**0.0545**		**198.2870**	**198.2870**	**5.0800e-003**		**198.4141**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.0765	42.4173	21.5136	0.0380		2.1974	2.1974		2.0216	2.0216	0.0000	3,685.1016	3,685.1016	1.1918		3,714.8975
Total	**4.0765**	**42.4173**	**21.5136**	**0.0380**	**18.0663**	**2.1974**	**20.2637**	**9.9307**	**2.0216**	**11.9523**	**0.0000**	**3,685.1016**	**3,685.1016**	**1.1918**		**3,714.8975**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0916	0.0542	0.7258	1.9900e-003	0.2012	1.2200e-003	0.2024	0.0534	1.1200e-003	0.0545		198.2870	198.2870	5.0800e-003		198.4141
Total	**0.0916**	**0.0542**	**0.7258**	**1.9900e-003**	**0.2012**	**1.2200e-003**	**0.2024**	**0.0534**	**1.1200e-003**	**0.0545**		**198.2870**	**198.2870**	**5.0800e-003**		**198.4141**

3.4 Grading - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	4.4501	50.1975	31.9583	0.0620		2.1739	2.1739		2.0000	2.0000		6,005.8653	6,005.8653	1.9424		6,054.4257
Total	**4.4501**	**50.1975**	**31.9583**	**0.0620**	**8.6733**	**2.1739**	**10.8472**	**3.5965**	**2.0000**	**5.5965**		**6,005.8653**	**6,005.8653**	**1.9424**		**6,054.4257**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1018	0.0602	0.8064	2.2100e-003	0.2236	1.3500e-003	0.2249	0.0593	1.2500e-003	0.0605		220.3189	220.3189	5.6500e-003		220.4601
Total	**0.1018**	**0.0602**	**0.8064**	**2.2100e-003**	**0.2236**	**1.3500e-003**	**0.2249**	**0.0593**	**1.2500e-003**	**0.0605**		**220.3189**	**220.3189**	**5.6500e-003**		**220.4601**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	4.4501	50.1975	31.9583	0.0620		2.1739	2.1739		2.0000	2.0000	0.0000	6,005.8653	6,005.8653	1.9424		6,054.4257
Total	**4.4501**	**50.1975**	**31.9583**	**0.0620**	**8.6733**	**2.1739**	**10.8472**	**3.5965**	**2.0000**	**5.5965**	**0.0000**	**6,005.8653**	**6,005.8653**	**1.9424**		**6,054.4257**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1018	0.0602	0.8064	2.2100e-003	0.2236	1.3500e-003	0.2249	0.0593	1.2500e-003	0.0605		220.3189	220.3189	5.6500e-003		220.4601
Total	**0.1018**	**0.0602**	**0.8064**	**2.2100e-003**	**0.2236**	**1.3500e-003**	**0.2249**	**0.0593**	**1.2500e-003**	**0.0605**		**220.3189**	**220.3189**	**5.6500e-003**		**220.4601**

3.5 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.1198	19.1860	16.8485	0.0269		1.1171	1.1171		1.0503	1.0503		2,553.0631	2,553.0631	0.6229		2,568.6345
Total	**2.1198**	**19.1860**	**16.8485**	**0.0269**		**1.1171**	**1.1171**		**1.0503**	**1.0503**		**2,553.0631**	**2,553.0631**	**0.6229**		**2,568.6345**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4683	17.2858	3.1623	0.0439	1.0758	0.0983	1.1741	0.3098	0.0941	0.4038		4,626.5675	4,626.5675	0.3470		4,635.2429
Worker	5.7605	3.4068	45.6439	0.1252	12.6531	0.0766	12.7297	3.3557	0.0706	3.4262		12,470.0502	12,470.0502	0.3196		12,478.0411
Total	**6.2288**	**20.6926**	**48.8063**	**0.1691**	**13.7289**	**0.1749**	**13.9038**	**3.6654**	**0.1646**	**3.8300**		**17,096.6177**	**17,096.6177**	**0.6667**		**17,113.2840**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.1198	19.1860	16.8485	0.0269		1.1171	1.1171		1.0503	1.0503	0.0000	2,553.0631	2,553.0631	0.6229		2,568.6345
Total	**2.1198**	**19.1860**	**16.8485**	**0.0269**		**1.1171**	**1.1171**		**1.0503**	**1.0503**	**0.0000**	**2,553.0631**	**2,553.0631**	**0.6229**		**2,568.6345**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4683	17.2858	3.1623	0.0439	1.0758	0.0983	1.1741	0.3098	0.0941	0.4038		4,626.5675	4,626.5675	0.3470		4,635.2429
Worker	5.7605	3.4068	45.6439	0.1252	12.6531	0.0766	12.7297	3.3557	0.0706	3.4262		12,470.0502	12,470.0502	0.3196		12,478.0411
Total	**6.2288**	**20.6926**	**48.8063**	**0.1691**	**13.7289**	**0.1749**	**13.9038**	**3.6654**	**0.1646**	**3.8300**		**17,096.6177**	**17,096.6177**	**0.6667**		**17,113.2840**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013		2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**		**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3922	15.5466	2.7738	0.0435	1.0758	0.0296	1.1053	0.3097	0.0283	0.3380		4,590.6172	4,590.6172	0.3284		4,598.8275
Worker	5.3668	3.0574	41.8514	0.1210	12.6531	0.0746	12.7277	3.3557	0.0687	3.4243		12,052.9803	12,052.9803	0.2874		12,060.1652
Total	**5.7590**	**18.6040**	**44.6251**	**0.1645**	**13.7289**	**0.1041**	**13.8330**	**3.6654**	**0.0969**	**3.7623**		**16,643.5975**	**16,643.5975**	**0.6158**		**16,658.9927**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013	0.0000	2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**	**0.0000**	**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3922	15.5466	2.7738	0.0435	1.0758	0.0296	1.1053	0.3097	0.0283	0.3380		4,590.6172	4,590.6172	0.3284		4,598.8275
Worker	5.3668	3.0574	41.8514	0.1210	12.6531	0.0746	12.7277	3.3557	0.0687	3.4243		12,052.9803	12,052.9803	0.2874		12,060.1652
Total	**5.7590**	**18.6040**	**44.6251**	**0.1645**	**13.7289**	**0.1041**	**13.8330**	**3.6654**	**0.0969**	**3.7623**		**16,643.5975**	**16,643.5975**	**0.6158**		**16,658.9927**

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612		2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**		**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3657	14.6677	2.5799	0.0431	1.0757	0.0249	1.1006	0.3097	0.0238	0.3335		4,551.5430	4,551.5430	0.3110		4,559.3188
Worker	5.0199	2.7515	38.6023	0.1165	12.6531	0.0726	12.7257	3.3557	0.0668	3.4225		11,612.5772	11,612.5772	0.2582		11,619.0309
Total	**5.3856**	**17.4192**	**41.1823**	**0.1597**	**13.7288**	**0.0975**	**13.8263**	**3.6654**	**0.0906**	**3.7560**		**16,164.1202**	**16,164.1202**	**0.5692**		**16,178.3497**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612	0.0000	2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**	**0.0000**	**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3657	14.6677	2.5799	0.0431	1.0757	0.0249	1.1006	0.3097	0.0238	0.3335		4,551.5430	4,551.5430	0.3110		4,559.3188
Worker	5.0199	2.7515	38.6023	0.1165	12.6531	0.0726	12.7257	3.3557	0.0668	3.4225		11,612.5772	11,612.5772	0.2582		11,619.0309
Total	**5.3856**	**17.4192**	**41.1823**	**0.1597**	**13.7288**	**0.0975**	**13.8263**	**3.6654**	**0.0906**	**3.7560**		**16,164.1202**	**16,164.1202**	**0.5692**		**16,178.3497**

3.5 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5728	14.3849	16.2440	0.0269		0.6997	0.6997		0.6584	0.6584		2,555.2099	2,555.2099	0.6079		2,570.4061
Total	**1.5728**	**14.3849**	**16.2440**	**0.0269**		**0.6997**	**0.6997**		**0.6584**	**0.6584**		**2,555.2099**	**2,555.2099**	**0.6079**		**2,570.4061**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.2805	11.0295	2.2740	0.0420	1.0757	0.0111	1.0868	0.3097	0.0106	0.3203		4,430.4884	4,430.4884	0.2387		4,436.4550
Worker	4.7067	2.4813	35.6254	0.1121	12.6531	0.0709	12.7240	3.3557	0.0652	3.4209		11,171.2689	11,171.2689	0.2317		11,177.0617
Total	**4.9872**	**13.5108**	**37.8993**	**0.1540**	**13.7288**	**0.0820**	**13.8107**	**3.6654**	**0.0759**	**3.7412**		**15,601.7573**	**15,601.7573**	**0.4704**		**15,613.5167**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5728	14.3849	16.2440	0.0269		0.6997	0.6997		0.6584	0.6584	0.0000	2,555.2099	2,555.2099	0.6079		2,570.4061
Total	**1.5728**	**14.3849**	**16.2440**	**0.0269**		**0.6997**	**0.6997**		**0.6584**	**0.6584**	**0.0000**	**2,555.2099**	**2,555.2099**	**0.6079**		**2,570.4061**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.2805	11.0295	2.2740	0.0420	1.0757	0.0111	1.0868	0.3097	0.0106	0.3203		4,430.4884	4,430.4884	0.2387		4,436.4550
Worker	4.7067	2.4813	35.6254	0.1121	12.6531	0.0709	12.7240	3.3557	0.0652	3.4209		11,171.2689	11,171.2689	0.2317		11,177.0617
Total	**4.9872**	**13.5108**	**37.8993**	**0.1540**	**13.7288**	**0.0820**	**13.8107**	**3.6654**	**0.0759**	**3.7412**		**15,601.7573**	**15,601.7573**	**0.4704**		**15,613.5167**

3.6 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0327	10.1917	14.5842	0.0228		0.5102	0.5102		0.4694	0.4694		2,207.5841	2,207.5841	0.7140		2,225.4336
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0327**	**10.1917**	**14.5842**	**0.0228**		**0.5102**	**0.5102**		**0.4694**	**0.4694**		**2,207.5841**	**2,207.5841**	**0.7140**		**2,225.4336**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0624	0.0329	0.4721	1.4900e-003	0.1677	9.4000e-004	0.1686	0.0445	8.6000e-004	0.0453		148.0292	148.0292	3.0700e-003		148.1059
Total	**0.0624**	**0.0329**	**0.4721**	**1.4900e-003**	**0.1677**	**9.4000e-004**	**0.1686**	**0.0445**	**8.6000e-004**	**0.0453**		**148.0292**	**148.0292**	**3.0700e-003**		**148.1059**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0327	10.1917	14.5842	0.0228		0.5102	0.5102		0.4694	0.4694	0.0000	2,207.5841	2,207.5841	0.7140		2,225.4336
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0327**	**10.1917**	**14.5842**	**0.0228**		**0.5102**	**0.5102**		**0.4694**	**0.4694**	**0.0000**	**2,207.5841**	**2,207.5841**	**0.7140**		**2,225.4336**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0624	0.0329	0.4721	1.4900e-003	0.1677	9.4000e-004	0.1686	0.0445	8.6000e-004	0.0453		148.0292	148.0292	3.0700e-003		148.1059
Total	**0.0624**	**0.0329**	**0.4721**	**1.4900e-003**	**0.1677**	**9.4000e-004**	**0.1686**	**0.0445**	**8.6000e-004**	**0.0453**		**148.0292**	**148.0292**	**3.0700e-003**		**148.1059**

3.7 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	178.8436					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708		281.4481	281.4481	0.0168		281.8690
Total	**179.0352**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**		**281.4481**	**281.4481**	**0.0168**		**281.8690**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.9397	0.4954	7.1125	0.0224	2.5262	0.0142	2.5403	0.6700	0.0130	0.6830		2,230.3063	2,230.3063	0.0463		2,231.4628
Total	**0.9397**	**0.4954**	**7.1125**	**0.0224**	**2.5262**	**0.0142**	**2.5403**	**0.6700**	**0.0130**	**0.6830**		**2,230.3063**	**2,230.3063**	**0.0463**		**2,231.4628**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	178.8436					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708	0.0000	281.4481	281.4481	0.0168		281.8690
Total	**179.0352**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**	**0.0000**	**281.4481**	**281.4481**	**0.0168**		**281.8690**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.9397	0.4954	7.1125	0.0224	2.5262	0.0142	2.5403	0.6700	0.0130	0.6830		2,230.3063	2,230.3063	0.0463		2,231.4628
Total	**0.9397**	**0.4954**	**7.1125**	**0.0224**	**2.5262**	**0.0142**	**2.5403**	**0.6700**	**0.0130**	**0.6830**		**2,230.3063**	**2,230.3063**	**0.0463**		**2,231.4628**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Mid Rise	14.70	5.90	8.70	0.00	0.00	0.00	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Mid Rise	0.565475	0.033834	0.192058	0.100675	0.009211	0.004032	0.016699	0.069908	0.001423	0.001062	0.004327	0.000756	0.000539

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.4714	4.0282	1.7142	0.0257		0.3257	0.3257		0.3257	0.3257		5,142.4377	5,142.4377	0.0986	0.0943	5,172.9966
NaturalGas Unmitigated	0.6871	5.8719	2.4987	0.0375		0.4748	0.4748		0.4748	0.4748		7,495.9851	7,495.9851	0.1437	0.1374	7,540.5300

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Mid Rise	63715.9	0.6871	5.8719	2.4987	0.0375		0.4748	0.4748		0.4748	0.4748		7,495.9851	7,495.9851	0.1437	0.1374	7,540.5300
Total		**0.6871**	**5.8719**	**2.4987**	**0.0375**		**0.4748**	**0.4748**		**0.4748**	**0.4748**		**7,495.9851**	**7,495.9851**	**0.1437**	**0.1374**	**7,540.5300**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Mid Rise	43.7107	0.4714	4.0282	1.7142	0.0257		0.3257	0.3257		0.3257	0.3257		5,142.4377	5,142.4377	0.0986	0.0943	5,172.9966
Total		**0.4714**	**4.0282**	**1.7142**	**0.0257**		**0.3257**	**0.3257**		**0.3257**	**0.3257**		**5,142.4377**	**5,142.4377**	**0.0986**	**0.0943**	**5,172.9966**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	37.6846	1.4910	129.2361	6.8500e-003		0.7192	0.7192		0.7192	0.7192	0.0000	233.5242	233.5242	0.2223	0.0000	239.0818
Unmitigated	37.6846	1.4910	129.2361	6.8500e-003		0.7192	0.7192		0.7192	0.7192	0.0000	233.5242	233.5242	0.2223	0.0000	239.0818

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.6949					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	31.1256					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	3.8641	1.4910	129.2361	6.8500e-003		0.7192	0.7192		0.7192	0.7192		233.5242	233.5242	0.2223		239.0818
Total	**37.6846**	**1.4910**	**129.2361**	**6.8500e-003**		**0.7192**	**0.7192**		**0.7192**	**0.7192**	**0.0000**	**233.5242**	**233.5242**	**0.2223**	**0.0000**	**239.0818**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.6949					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	31.1256					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	3.8641	1.4910	129.2361	6.8500e-003		0.7192	0.7192		0.7192	0.7192		233.5242	233.5242	0.2223		239.0818
Total	**37.6846**	**1.4910**	**129.2361**	**6.8500e-003**		**0.7192**	**0.7192**		**0.7192**	**0.7192**	**0.0000**	**233.5242**	**233.5242**	**0.2223**	**0.0000**	**239.0818**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Non-Residential Operations CalEEMod Output

City of Murrieta General Plan Update - Non-Residential

Riverside-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Research & Development	2,406.00	1000sqft	55.23	2,406,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2035
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - GP Update will reduce 2,405,600 SF in non-residential uses.

Construction Phase -

Grading -

Vehicle Trips - On-road transportation analyzed in seperate CalEEMod run

Woodstoves -

Energy Mitigation - Increased efficiency to meet 2019 Title 24 Standards

Table Name	Column Name	Default Value	New Value

tblVehicleTrips	ST_TR	1.90	0.00
tblVehicleTrips	SU_TR	1.11	0.00
tblVehicleTrips	WD_TR	8.11	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.2237	2.2763	1.3152	2.3400e-003	0.5294	0.1155	0.6448	0.2237	0.1069	0.3305	0.0000	209.4537	209.4537	0.0591	0.0000	210.9312
2020	0.7694	7.5503	5.7349	0.0195	1.3309	0.2246	1.5554	0.4256	0.2090	0.6346	0.0000	1,787.1394	1,787.1394	0.2120	0.0000	1,792.4381
2021	0.8016	7.3595	6.2488	0.0265	1.4292	0.1409	1.5701	0.3870	0.1325	0.5194	0.0000	2,449.8809	2,449.8809	0.1894	0.0000	2,454.6166
2022	0.7379	6.7896	5.8860	0.0259	1.4237	0.1193	1.5430	0.3855	0.1122	0.4977	0.0000	2,397.3918	2,397.3918	0.1811	0.0000	2,401.9196
2023	0.6693	5.4695	5.5328	0.0252	1.4237	0.1007	1.5244	0.3855	0.0946	0.4801	0.0000	2,332.3187	2,332.3187	0.1576	0.0000	2,336.2574
2024	2.5473	3.9002	4.1466	0.0176	0.9653	0.0775	1.0429	0.2613	0.0726	0.3338	0.0000	1,619.2272	1,619.2272	0.1272	0.0000	1,622.4074
2025	9.0912	0.0440	0.1642	4.9000e-004	0.0516	1.8600e-003	0.0535	0.0137	1.8300e-003	0.0155	0.0000	43.6106	43.6106	1.0700e-003	0.0000	43.6375
Maximum	**9.0912**	**7.5503**	**6.2488**	**0.0265**	**1.4292**	**0.2246**	**1.5701**	**0.4256**	**0.2090**	**0.6346**	**0.0000**	**2,449.8809**	**2,449.8809**	**0.2120**	**0.0000**	**2,454.6166**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Year	tons/yr										MT/yr					
2019	0.2237	2.2762	1.3152	2.3400e-003	0.5294	0.1155	0.6448	0.2237	0.1069	0.3305	0.0000	209.4534	209.4534	0.0591	0.0000	210.9309
2020	0.7694	7.5503	5.7349	0.0195	1.3309	0.2246	1.5554	0.4256	0.2090	0.6346	0.0000	1,787.1389	1,787.1389	0.2120	0.0000	1,792.4375
2021	0.8016	7.3595	6.2488	0.0265	1.4292	0.1409	1.5701	0.3870	0.1325	0.5194	0.0000	2,449.8805	2,449.8805	0.1894	0.0000	2,454.6162
2022	0.7379	6.7896	5.8860	0.0259	1.4237	0.1193	1.5430	0.3855	0.1122	0.4977	0.0000	2,397.3915	2,397.3915	0.1811	0.0000	2,401.9192
2023	0.6693	5.4695	5.5328	0.0252	1.4237	0.1007	1.5244	0.3855	0.0946	0.4801	0.0000	2,332.3184	2,332.3184	0.1576	0.0000	2,336.2571
2024	2.5473	3.9002	4.1466	0.0176	0.9653	0.0775	1.0429	0.2613	0.0726	0.3338	0.0000	1,619.2269	1,619.2269	0.1272	0.0000	1,622.4071
2025	9.0912	0.0440	0.1642	4.9000e-004	0.0516	1.8600e-003	0.0535	0.0137	1.8300e-003	0.0155	0.0000	43.6106	43.6106	1.0700e-003	0.0000	43.6375
Maximum	**9.0912**	**7.5503**	**6.2488**	**0.0265**	**1.4292**	**0.2246**	**1.5701**	**0.4256**	**0.2090**	**0.6346**	**0.0000**	**2,449.8805**	**2,449.8805**	**0.2120**	**0.0000**	**2,454.6162**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**7-25-2019**	**10-24-2019**	1.2955	1.2955
2	**10-25-2019**	**1-24-2020**	1.6830	1.6830
3	**1-25-2020**	**4-24-2020**	1.7813	1.7813
4	**4-25-2020**	**7-24-2020**	2.0790	2.0790
5	**7-25-2020**	**10-24-2020**	2.2717	2.2717
6	**10-25-2020**	**1-24-2021**	2.2094	2.2094
7	**1-25-2021**	**4-24-2021**	2.0011	2.0011
8	**4-25-2021**	**7-24-2021**	2.0294	2.0294
9	**7-25-2021**	**10-24-2021**	2.0495	2.0495
10	**10-25-2021**	**1-24-2022**	2.0039	2.0039
11	**1-25-2022**	**4-24-2022**	1.8533	1.8533
12	**4-25-2022**	**7-24-2022**	1.8806	1.8806
13	**7-25-2022**	**10-24-2022**	1.8989	1.8989

14	**10-25-2022**	**1-24-2023**	1.8020	1.8020
15	**1-25-2023**	**4-24-2023**	1.5157	1.5157
16	**4-25-2023**	**7-24-2023**	1.5396	1.5396
17	**7-25-2023**	**10-24-2023**	1.5540	1.5540
18	**10-25-2023**	**1-24-2024**	1.5337	1.5337
19	**1-25-2024**	**4-24-2024**	1.4827	1.4827
20	**4-25-2024**	**7-24-2024**	1.4896	1.4896
21	**7-25-2024**	**10-24-2024**	0.7888	0.7888
22	**10-25-2024**	**1-24-2025**	4.8900	4.8900
23	**1-25-2025**	**4-24-2025**	6.5260	6.5260
		Highest	6.5260	6.5260

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	9.8121	2.7000e-004	0.0305	0.0000		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004	0.0000	0.0597	0.0597	1.5000e-004	0.0000	0.0636
Energy	0.4215	3.8319	3.2188	0.0230		0.2912	0.2912		0.2912	0.2912	0.0000	11,952.5210	11,952.5210	0.4012	0.1429	12,005.1470
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	37.1149	0.0000	37.1149	2.1934	0.0000	91.9505
Water						0.0000	0.0000		0.0000	0.0000	375.3163	4,908.0593	5,283.3756	38.7512	0.9521	6,535.8931
Total	**10.2336**	**3.8322**	**3.2493**	**0.0230**	**0.0000**	**0.2913**	**0.2913**	**0.0000**	**0.2913**	**0.2913**	**412.4312**	**16,860.6400**	**17,273.0711**	**41.3460**	**1.0951**	**18,633.0541**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	9.8121	2.7000e-004	0.0305	0.0000		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004	0.0000	0.0597	0.0597	1.5000e-004	0.0000	0.0636
Energy	0.3617	3.2884	2.7623	0.0197		0.2499	0.2499		0.2499	0.2499	0.0000	10,854.9265	10,854.9265	0.3690	0.1278	10,902.2266
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	37.1149	0.0000	37.1149	2.1934	0.0000	91.9505
Water						0.0000	0.0000		0.0000	0.0000	375.3163	4,908.0593	5,283.3756	38.7512	0.9521	6,535.8931
Total	**10.1738**	**3.2887**	**2.7928**	**0.0197**	**0.0000**	**0.2500**	**0.2500**	**0.0000**	**0.2500**	**0.2500**	**412.4312**	**15,763.0455**	**16,175.4766**	**41.3138**	**1.0799**	**17,530.1337**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.58**	**14.18**	**14.05**	**14.18**	**0.00**	**14.18**	**14.18**	**0.00**	**14.18**	**14.18**	**0.00**	**6.51**	**6.35**	**0.08**	**1.39**	**5.92**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	7/25/2019	10/30/2019	5	70	
2	Site Preparation	Site Preparation	10/31/2019	12/25/2019	5	40	
3	Grading	Grading	12/26/2019	5/27/2020	5	110	
4	Building Construction	Building Construction	5/28/2020	8/28/2024	5	1110	
5	Paving	Paving	8/29/2024	12/11/2024	5	75	
6	Architectural Coating	Architectural Coating	12/12/2024	3/26/2025	5	75	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 275

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 3,609,000; Non-Residential Outdoor: 1,203,000; Striped Parking

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	770.00	394.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	154.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1230	1.2524	0.7721	1.3600e-003		0.0628	0.0628		0.0584	0.0584	0.0000	121.1922	121.1922	0.0337	0.0000	122.0350
Total	**0.1230**	**1.2524**	**0.7721**	**1.3600e-003**		**0.0628**	**0.0628**		**0.0584**	**0.0584**	**0.0000**	**121.1922**	**121.1922**	**0.0337**	**0.0000**	**122.0350**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Worker	2.6100e-003	1.9000e-003	0.0199	6.0000e-005	5.7700e-003	4.0000e-005	5.8100e-003	1.5300e-003	3.0000e-005	1.5700e-003	0.0000	4.9854	4.9854	1.4000e-004	0.0000	4.9889
Total	**2.6100e-003**	**1.9000e-003**	**0.0199**	**6.0000e-005**	**5.7700e-003**	**4.0000e-005**	**5.8100e-003**	**1.5300e-003**	**3.0000e-005**	**1.5700e-003**	**0.0000**	**4.9854**	**4.9854**	**1.4000e-004**	**0.0000**	**4.9889**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1230	1.2524	0.7721	1.3600e-003		0.0628	0.0628		0.0584	0.0584	0.0000	121.1920	121.1920	0.0337	0.0000	122.0349
Total	**0.1230**	**1.2524**	**0.7721**	**1.3600e-003**		**0.0628**	**0.0628**		**0.0584**	**0.0584**	**0.0000**	**121.1920**	**121.1920**	**0.0337**	**0.0000**	**122.0349**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.6100e-003	1.9000e-003	0.0199	6.0000e-005	5.7700e-003	4.0000e-005	5.8100e-003	1.5300e-003	3.0000e-005	1.5700e-003	0.0000	4.9854	4.9854	1.4000e-004	0.0000	4.9889
Total	**2.6100e-003**	**1.9000e-003**	**0.0199**	**6.0000e-005**	**5.7700e-003**	**4.0000e-005**	**5.8100e-003**	**1.5300e-003**	**3.0000e-005**	**1.5700e-003**	**0.0000**	**4.9854**	**4.9854**	**1.4000e-004**	**0.0000**	**4.9889**

3.3 Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3613	0.0000	0.3613	0.1986	0.0000	0.1986	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0867	0.9115	0.4413	7.6000e-004		0.0478	0.0478		0.0440	0.0440	0.0000	68.3374	68.3374	0.0216	0.0000	68.8779
Total	**0.0867**	**0.9115**	**0.4413**	**7.6000e-004**	**0.3613**	**0.0478**	**0.4091**	**0.1986**	**0.0440**	**0.2426**	**0.0000**	**68.3374**	**68.3374**	**0.0216**	**0.0000**	**68.8779**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.7900e-003	1.3000e-003	0.0137	4.0000e-005	3.9600e-003	2.0000e-005	3.9800e-003	1.0500e-003	2.0000e-005	1.0700e-003	0.0000	3.4186	3.4186	9.0000e-005	0.0000	3.4209
Total	**1.7900e-003**	**1.3000e-003**	**0.0137**	**4.0000e-005**	**3.9600e-003**	**2.0000e-005**	**3.9800e-003**	**1.0500e-003**	**2.0000e-005**	**1.0700e-003**	**0.0000**	**3.4186**	**3.4186**	**9.0000e-005**	**0.0000**	**3.4209**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Fugitive Dust					0.3613	0.0000	0.3613	0.1986	0.0000	0.1986	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0867	0.9115	0.4413	7.6000e-004		0.0478	0.0478		0.0440	0.0440	0.0000	68.3373	68.3373	0.0216	0.0000	68.8778
Total	**0.0867**	**0.9115**	**0.4413**	**7.6000e-004**	**0.3613**	**0.0478**	**0.4091**	**0.1986**	**0.0440**	**0.2426**	**0.0000**	**68.3373**	**68.3373**	**0.0216**	**0.0000**	**68.8778**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.7900e-003	1.3000e-003	0.0137	4.0000e-005	3.9600e-003	2.0000e-005	3.9800e-003	1.0500e-003	2.0000e-005	1.0700e-003	0.0000	3.4186	3.4186	9.0000e-005	0.0000	3.4209
Total	**1.7900e-003**	**1.3000e-003**	**0.0137**	**4.0000e-005**	**3.9600e-003**	**2.0000e-005**	**3.9800e-003**	**1.0500e-003**	**2.0000e-005**	**1.0700e-003**	**0.0000**	**3.4186**	**3.4186**	**9.0000e-005**	**0.0000**	**3.4209**

3.4 Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1579	0.0000	0.1579	0.0224	0.0000	0.0224	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.4800e-003	0.1090	0.0668	1.2000e-004		4.7700e-003	4.7700e-003		4.3800e-003	4.3800e-003	0.0000	11.1403	11.1403	3.5200e-003	0.0000	11.2284

Total	**9.4800e-003**	**0.1090**	**0.0668**	**1.2000e-004**	**0.1579**	**4.7700e-003**	**0.1626**	**0.0224**	**4.3800e-003**	**0.0268**	**0.0000**	**11.1403**	**11.1403**	**3.5200e-003**	**0.0000**	**11.2284**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-004	1.4000e-004	1.5200e-003	0.0000	4.4000e-004	0.0000	4.4000e-004	1.2000e-004	0.0000	1.2000e-004	0.0000	0.3798	0.3798	1.0000e-005	0.0000	0.3801
Total	**2.0000e-004**	**1.4000e-004**	**1.5200e-003**	**0.0000**	**4.4000e-004**	**0.0000**	**4.4000e-004**	**1.2000e-004**	**0.0000**	**1.2000e-004**	**0.0000**	**0.3798**	**0.3798**	**1.0000e-005**	**0.0000**	**0.3801**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1579	0.0000	0.1579	0.0224	0.0000	0.0224	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.4800e-003	0.1090	0.0668	1.2000e-004		4.7700e-003	4.7700e-003		4.3800e-003	4.3800e-003	0.0000	11.1403	11.1403	3.5200e-003	0.0000	11.2284
Total	**9.4800e-003**	**0.1090**	**0.0668**	**1.2000e-004**	**0.1579**	**4.7700e-003**	**0.1626**	**0.0224**	**4.3800e-003**	**0.0268**	**0.0000**	**11.1403**	**11.1403**	**3.5200e-003**	**0.0000**	**11.2284**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-004	1.4000e-004	1.5200e-003	0.0000	4.4000e-004	0.0000	4.4000e-004	1.2000e-004	0.0000	1.2000e-004	0.0000	0.3798	0.3798	1.0000e-005	0.0000	0.3801
Total	**2.0000e-004**	**1.4000e-004**	**1.5200e-003**	**0.0000**	**4.4000e-004**	**0.0000**	**4.4000e-004**	**1.2000e-004**	**0.0000**	**1.2000e-004**	**0.0000**	**0.3798**	**0.3798**	**1.0000e-005**	**0.0000**	**0.3801**

3.4 Grading - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.4650	0.0000	0.4650	0.1912	0.0000	0.1912	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2359	2.6605	1.6938	3.2900e-003		0.1152	0.1152		0.1060	0.1060	0.0000	288.7668	288.7668	0.0934	0.0000	291.1016
Total	**0.2359**	**2.6605**	**1.6938**	**3.2900e-003**	**0.4650**	**0.1152**	**0.5802**	**0.1912**	**0.1060**	**0.2972**	**0.0000**	**288.7668**	**288.7668**	**0.0934**	**0.0000**	**291.1016**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.8700e-003	3.4100e-003	0.0365	1.1000e-004	0.0117	7.0000e-005	0.0117	3.0900e-003	7.0000e-005	3.1600e-003	0.0000	9.7477	9.7477	2.4000e-004	0.0000	9.7538
Total	**4.8700e-003**	**3.4100e-003**	**0.0365**	**1.1000e-004**	**0.0117**	**7.0000e-005**	**0.0117**	**3.0900e-003**	**7.0000e-005**	**3.1600e-003**	**0.0000**	**9.7477**	**9.7477**	**2.4000e-004**	**0.0000**	**9.7538**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.4650	0.0000	0.4650	0.1912	0.0000	0.1912	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2359	2.6605	1.6938	3.2900e-003		0.1152	0.1152		0.1060	0.1060	0.0000	288.7664	288.7664	0.0934	0.0000	291.1012
Total	**0.2359**	**2.6605**	**1.6938**	**3.2900e-003**	**0.4650**	**0.1152**	**0.5802**	**0.1912**	**0.1060**	**0.2972**	**0.0000**	**288.7664**	**288.7664**	**0.0934**	**0.0000**	**291.1012**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.8700e-003	3.4100e-003	0.0365	1.1000e-004	0.0117	7.0000e-005	0.0117	3.0900e-003	7.0000e-005	3.1600e-003	0.0000	9.7477	9.7477	2.4000e-004	0.0000	9.7538

Total	**4.8700e-003**	**3.4100e-003**	**0.0365**	**1.1000e-004**	**0.0117**	**7.0000e-005**	**0.0117**	**3.0900e-003**	**7.0000e-005**	**3.1600e-003**	**0.0000**	**9.7477**	**9.7477**	**2.4000e-004**	**0.0000**	**9.7538**

3.5 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1654	1.4965	1.3142	2.1000e-003		0.0871	0.0871		0.0819	0.0819	0.0000	180.6558	180.6558	0.0441	0.0000	181.7576
Total	**0.1654**	**1.4965**	**1.3142**	**2.1000e-003**		**0.0871**	**0.0871**		**0.0819**	**0.0819**	**0.0000**	**180.6558**	**180.6558**	**0.0441**	**0.0000**	**181.7576**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0873	3.1965	0.6253	7.9000e-003	0.1941	0.0181	0.2122	0.0560	0.0173	0.0733	0.0000	755.6620	755.6620	0.0604	0.0000	757.1721
Worker	0.2760	0.1934	2.0652	6.1100e-003	0.6601	4.0700e-003	0.6642	0.1753	3.7400e-003	0.1790	0.0000	552.3072	552.3072	0.0138	0.0000	552.6530
Total	**0.3634**	**3.3899**	**2.6905**	**0.0140**	**0.8543**	**0.0221**	**0.8764**	**0.2313**	**0.0210**	**0.2523**	**0.0000**	**1,307.9692**	**1,307.9692**	**0.0742**	**0.0000**	**1,309.8251**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1654	1.4965	1.3142	2.1000e-003		0.0871	0.0871		0.0819	0.0819	0.0000	180.6556	180.6556	0.0441	0.0000	181.7574
Total	**0.1654**	**1.4965**	**1.3142**	**2.1000e-003**		**0.0871**	**0.0871**		**0.0819**	**0.0819**	**0.0000**	**180.6556**	**180.6556**	**0.0441**	**0.0000**	**181.7574**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0873	3.1965	0.6253	7.9000e-003	0.1941	0.0181	0.2122	0.0560	0.0173	0.0733	0.0000	755.6620	755.6620	0.0604	0.0000	757.1721
Worker	0.2760	0.1934	2.0652	6.1100e-003	0.6601	4.0700e-003	0.6642	0.1753	3.7400e-003	0.1790	0.0000	552.3072	552.3072	0.0138	0.0000	552.6530
Total	**0.3634**	**3.3899**	**2.6905**	**0.0140**	**0.8543**	**0.0221**	**0.8764**	**0.2313**	**0.0210**	**0.2523**	**0.0000**	**1,307.9692**	**1,307.9692**	**0.0742**	**0.0000**	**1,309.8251**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Off-Road	0.2481	2.2749	2.1631	3.5100e-003		0.1251	0.1251		0.1176	0.1176	0.0000	302.2867	302.2867	0.0729	0.0000	304.1099
Total	**0.2481**	**2.2749**	**2.1631**	**3.5100e-003**		**0.1251**	**0.1251**		**0.1176**	**0.1176**	**0.0000**	**302.2867**	**302.2867**	**0.0729**	**0.0000**	**304.1099**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1227	4.7943	0.9224	0.0131	0.3247	9.1700e-003	0.3339	0.0937	8.7700e-003	0.1025	0.0000	1,254.4370	1,254.4370	0.0957	0.0000	1,256.8293
Worker	0.4308	0.2903	3.1633	9.8800e-003	1.1045	6.6200e-003	1.1111	0.2933	6.0900e-003	0.2994	0.0000	893.1573	893.1573	0.0208	0.0000	893.6774
Total	**0.5535**	**5.0846**	**4.0857**	**0.0230**	**1.4292**	**0.0158**	**1.4450**	**0.3870**	**0.0149**	**0.4018**	**0.0000**	**2,147.5942**	**2,147.5942**	**0.1165**	**0.0000**	**2,150.5067**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2481	2.2749	2.1631	3.5100e-003		0.1251	0.1251		0.1176	0.1176	0.0000	302.2863	302.2863	0.0729	0.0000	304.1095
Total	**0.2481**	**2.2749**	**2.1631**	**3.5100e-003**		**0.1251**	**0.1251**		**0.1176**	**0.1176**	**0.0000**	**302.2863**	**302.2863**	**0.0729**	**0.0000**	**304.1095**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1227	4.7943	0.9224	0.0131	0.3247	9.1700e-003	0.3339	0.0937	8.7700e-003	0.1025	0.0000	1,254.4370	1,254.4370	0.0957	0.0000	1,256.8293
Worker	0.4308	0.2903	3.1633	9.8800e-003	1.1045	6.6200e-003	1.1111	0.2933	6.0900e-003	0.2994	0.0000	893.1573	893.1573	0.0208	0.0000	893.6774
Total	**0.5535**	**5.0846**	**4.0857**	**0.0230**	**1.4292**	**0.0158**	**1.4450**	**0.3870**	**0.0149**	**0.4018**	**0.0000**	**2,147.5942**	**2,147.5942**	**0.1165**	**0.0000**	**2,150.5067**

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2218	2.0300	2.1272	3.5000e-003		0.1052	0.1052		0.0990	0.0990	0.0000	301.2428	301.2428	0.0722	0.0000	303.0471
Total	**0.2218**	**2.0300**	**2.1272**	**3.5000e-003**		**0.1052**	**0.1052**		**0.0990**	**0.0990**	**0.0000**	**301.2428**	**301.2428**	**0.0722**	**0.0000**	**303.0471**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1140	4.4994	0.8559	0.0130	0.3235	7.6800e-003	0.3312	0.0933	7.3500e-003	0.1007	0.0000	1,238.8815	1,238.8815	0.0903	0.0000	1,241.1393
Worker	0.4021	0.2602	2.9029	9.4800e-003	1.1002	6.4200e-003	1.1067	0.2922	5.9100e-003	0.2981	0.0000	857.2675	857.2675	0.0186	0.0000	857.7332
Total	**0.5161**	**4.7596**	**3.7588**	**0.0224**	**1.4237**	**0.0141**	**1.4378**	**0.3855**	**0.0133**	**0.3987**	**0.0000**	**2,096.1490**	**2,096.1490**	**0.1089**	**0.0000**	**2,098.8725**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2218	2.0300	2.1272	3.5000e-003		0.1052	0.1052		0.0990	0.0990	0.0000	301.2425	301.2425	0.0722	0.0000	303.0467
Total	**0.2218**	**2.0300**	**2.1272**	**3.5000e-003**		**0.1052**	**0.1052**		**0.0990**	**0.0990**	**0.0000**	**301.2425**	**301.2425**	**0.0722**	**0.0000**	**303.0467**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Vendor	0.1140	4.4994	0.8559	0.0130	0.3235	7.6800e-003	0.3312	0.0933	7.3500e-003	0.1007	0.0000	1,238.8815	1,238.8815	0.0903	0.0000	1,241.1393
Worker	0.4021	0.2602	2.9029	9.4800e-003	1.1002	6.4200e-003	1.1067	0.2922	5.9100e-003	0.2981	0.0000	857.2675	857.2675	0.0186	0.0000	857.7332
Total	**0.5161**	**4.7596**	**3.7588**	**0.0224**	**1.4237**	**0.0141**	**1.4378**	**0.3855**	**0.0133**	**0.3987**	**0.0000**	**2,096.1490**	**2,096.1490**	**0.1089**	**0.0000**	**2,098.8725**

3.5 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2045	1.8700	2.1117	3.5000e-003		0.0910	0.0910		0.0856	0.0856	0.0000	301.3462	301.3462	0.0717	0.0000	303.1383
Total	**0.2045**	**1.8700**	**2.1117**	**3.5000e-003**		**0.0910**	**0.0910**		**0.0856**	**0.0856**	**0.0000**	**301.3462**	**301.3462**	**0.0717**	**0.0000**	**303.1383**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0872	3.3649	0.7454	0.0126	0.3235	3.4300e-003	0.3269	0.0933	3.2800e-003	0.0966	0.0000	1,206.2412	1,206.2412	0.0691	0.0000	1,207.9694
Worker	0.3777	0.2346	2.6758	9.1200e-003	1.1002	6.2700e-003	1.1065	0.2922	5.7700e-003	0.2979	0.0000	824.7314	824.7314	0.0167	0.0000	825.1498
Total	**0.4649**	**3.5994**	**3.4211**	**0.0217**	**1.4237**	**9.7000e-003**	**1.4334**	**0.3855**	**9.0500e-003**	**0.3945**	**0.0000**	**2,030.9726**	**2,030.9726**	**0.0859**	**0.0000**	**2,033.1191**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2045	1.8700	2.1117	3.5000e-003		0.0910	0.0910		0.0856	0.0856	0.0000	301.3458	301.3458	0.0717	0.0000	303.1380
Total	**0.2045**	**1.8700**	**2.1117**	**3.5000e-003**		**0.0910**	**0.0910**		**0.0856**	**0.0856**	**0.0000**	**301.3458**	**301.3458**	**0.0717**	**0.0000**	**303.1380**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0872	3.3649	0.7454	0.0126	0.3235	3.4300e-003	0.3269	0.0933	3.2800e-003	0.0966	0.0000	1,206.2412	1,206.2412	0.0691	0.0000	1,207.9694
Worker	0.3777	0.2346	2.6758	9.1200e-003	1.1002	6.2700e-003	1.1065	0.2922	5.7700e-003	0.2979	0.0000	824.7314	824.7314	0.0167	0.0000	825.1498
Total	**0.4649**	**3.5994**	**3.4211**	**0.0217**	**1.4237**	**9.7000e-003**	**1.4334**	**0.3855**	**9.0500e-003**	**0.3945**	**0.0000**	**2,030.9726**	**2,030.9726**	**0.0859**	**0.0000**	**2,033.1191**

3.5 Building Construction - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1273	1.1629	1.3984	2.3300e-003		0.0531	0.0531		0.0499	0.0499	0.0000	200.5495	200.5495	0.0474	0.0000	201.7351
Total	**0.1273**	**1.1629**	**1.3984**	**2.3300e-003**		**0.0531**	**0.0531**		**0.0499**	**0.0499**	**0.0000**	**200.5495**	**200.5495**	**0.0474**	**0.0000**	**201.7351**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0569	2.2267	0.4793	8.3500e-003	0.2152	2.2700e-003	0.2175	0.0621	2.1700e-003	0.0643	0.0000	799.5938	799.5938	0.0450	0.0000	800.7185
Worker	0.2372	0.1415	1.6666	5.8500e-003	0.7321	4.1300e-003	0.7362	0.1944	3.8000e-003	0.1982	0.0000	529.1637	529.1637	0.0102	0.0000	529.4176
Total	**0.2942**	**2.3682**	**2.1460**	**0.0142**	**0.9473**	**6.4000e-003**	**0.9537**	**0.2565**	**5.9700e-003**	**0.2625**	**0.0000**	**1,328.7575**	**1,328.7575**	**0.0552**	**0.0000**	**1,330.1361**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1273	1.1629	1.3984	2.3300e-003		0.0531	0.0531		0.0499	0.0499	0.0000	200.5492	200.5492	0.0474	0.0000	201.7348

Total	**0.1273**	**1.1629**	**1.3984**	**2.3300e-003**		**0.0531**	**0.0531**		**0.0499**	**0.0499**	**0.0000**	**200.5492**	**200.5492**	**0.0474**	**0.0000**	**201.7348**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0569	2.2267	0.4793	8.3500e-003	0.2152	2.2700e-003	0.2175	0.0621	2.1700e-003	0.0643	0.0000	799.5938	799.5938	0.0450	0.0000	800.7185
Worker	0.2372	0.1415	1.6666	5.8500e-003	0.7321	4.1300e-003	0.7362	0.1944	3.8000e-003	0.1982	0.0000	529.1637	529.1637	0.0102	0.0000	529.4176
Total	**0.2942**	**2.3682**	**2.1460**	**0.0142**	**0.9473**	**6.4000e-003**	**0.9537**	**0.2565**	**5.9700e-003**	**0.2625**	**0.0000**	**1,328.7575**	**1,328.7575**	**0.0552**	**0.0000**	**1,330.1361**

3.6 Paving - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0371	0.3572	0.5485	8.6000e-004		0.0176	0.0176		0.0162	0.0162	0.0000	75.0995	75.0995	0.0243	0.0000	75.7067
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0371**	**0.3572**	**0.5485**	**8.6000e-004**		**0.0176**	**0.0176**		**0.0162**	**0.0162**	**0.0000**	**75.0995**	**75.0995**	**0.0243**	**0.0000**	**75.7067**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-003	1.1900e-003	0.0141	5.0000e-005	6.1800e-003	3.0000e-005	6.2200e-003	1.6400e-003	3.0000e-005	1.6700e-003	0.0000	4.4690	4.4690	9.0000e-005	0.0000	4.4711
Total	**2.0000e-003**	**1.1900e-003**	**0.0141**	**5.0000e-005**	**6.1800e-003**	**3.0000e-005**	**6.2200e-003**	**1.6400e-003**	**3.0000e-005**	**1.6700e-003**	**0.0000**	**4.4690**	**4.4690**	**9.0000e-005**	**0.0000**	**4.4711**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0371	0.3572	0.5485	8.6000e-004		0.0176	0.0176		0.0162	0.0162	0.0000	75.0994	75.0994	0.0243	0.0000	75.7066
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0371**	**0.3572**	**0.5485**	**8.6000e-004**		**0.0176**	**0.0176**		**0.0162**	**0.0162**	**0.0000**	**75.0994**	**75.0994**	**0.0243**	**0.0000**	**75.7066**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-003	1.1900e-003	0.0141	5.0000e-005	6.1800e-003	3.0000e-005	6.2200e-003	1.6400e-003	3.0000e-005	1.6700e-003	0.0000	4.4690	4.4690	9.0000e-005	0.0000	4.4711
Total	**2.0000e-003**	**1.1900e-003**	**0.0141**	**5.0000e-005**	**6.1800e-003**	**3.0000e-005**	**6.2200e-003**	**1.6400e-003**	**3.0000e-005**	**1.6700e-003**	**0.0000**	**4.4690**	**4.4690**	**9.0000e-005**	**0.0000**	**4.4711**

3.7 Architectural Coating - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	2.0817					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.2700e-003	8.5300e-003	0.0127	2.0000e-005		4.3000e-004	4.3000e-004		4.3000e-004	4.3000e-004	0.0000	1.7873	1.7873	1.0000e-004	0.0000	1.7898
Total	**2.0829**	**8.5300e-003**	**0.0127**	**2.0000e-005**		**4.3000e-004**	**4.3000e-004**		**4.3000e-004**	**4.3000e-004**	**0.0000**	**1.7873**	**1.7873**	**1.0000e-004**	**0.0000**	**1.7898**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Worker	3.8400e-003	2.2900e-003	0.0270	9.0000e-005	0.0119	7.0000e-005	0.0119	3.1500e-003	6.0000e-005	3.2100e-003	0.0000	8.5645	8.5645	1.6000e-004	0.0000	8.5686
Total	**3.8400e-003**	**2.2900e-003**	**0.0270**	**9.0000e-005**	**0.0119**	**7.0000e-005**	**0.0119**	**3.1500e-003**	**6.0000e-005**	**3.2100e-003**	**0.0000**	**8.5645**	**8.5645**	**1.6000e-004**	**0.0000**	**8.5686**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	2.0817					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.2700e-003	8.5300e-003	0.0127	2.0000e-005		4.3000e-004	4.3000e-004		4.3000e-004	4.3000e-004	0.0000	1.7873	1.7873	1.0000e-004	0.0000	1.7898
Total	**2.0829**	**8.5300e-003**	**0.0127**	**2.0000e-005**		**4.3000e-004**	**4.3000e-004**		**4.3000e-004**	**4.3000e-004**	**0.0000**	**1.7873**	**1.7873**	**1.0000e-004**	**0.0000**	**1.7898**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.8400e-003	2.2900e-003	0.0270	9.0000e-005	0.0119	7.0000e-005	0.0119	3.1500e-003	6.0000e-005	3.2100e-003	0.0000	8.5645	8.5645	1.6000e-004	0.0000	8.5686
Total	**3.8400e-003**	**2.2900e-003**	**0.0270**	**9.0000e-005**	**0.0119**	**7.0000e-005**	**0.0119**	**3.1500e-003**	**6.0000e-005**	**3.2100e-003**	**0.0000**	**8.5645**	**8.5645**	**1.6000e-004**	**0.0000**	**8.5686**

3.7 Architectural Coating - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	9.0701					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.2100e-003	0.0349	0.0552	9.0000e-005		1.5700e-003	1.5700e-003		1.5700e-003	1.5700e-003	0.0000	7.7874	7.7874	4.2000e-004	0.0000	7.7980
Total	**9.0754**	**0.0349**	**0.0552**	**9.0000e-005**		**1.5700e-003**	**1.5700e-003**		**1.5700e-003**	**1.5700e-003**	**0.0000**	**7.7874**	**7.7874**	**4.2000e-004**	**0.0000**	**7.7980**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0158	9.0800e-003	0.1090	4.0000e-004	0.0516	2.9000e-004	0.0519	0.0137	2.6000e-004	0.0140	0.0000	35.8232	35.8232	6.5000e-004	0.0000	35.8395
Total	**0.0158**	**9.0800e-003**	**0.1090**	**4.0000e-004**	**0.0516**	**2.9000e-004**	**0.0519**	**0.0137**	**2.6000e-004**	**0.0140**	**0.0000**	**35.8232**	**35.8232**	**6.5000e-004**	**0.0000**	**35.8395**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Archit. Coating	9.0701					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.2100e-003	0.0349	0.0552	9.0000e-005		1.5700e-003	1.5700e-003		1.5700e-003	1.5700e-003	0.0000	7.7874	7.7874	4.2000e-004	0.0000	7.7980
Total	**9.0754**	**0.0349**	**0.0552**	**9.0000e-005**		**1.5700e-003**	**1.5700e-003**		**1.5700e-003**	**1.5700e-003**	**0.0000**	**7.7874**	**7.7874**	**4.2000e-004**	**0.0000**	**7.7980**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0158	9.0800e-003	0.1090	4.0000e-004	0.0516	2.9000e-004	0.0519	0.0137	2.6000e-004	0.0140	0.0000	35.8232	35.8232	6.5000e-004	0.0000	35.8395
Total	**0.0158**	**9.0800e-003**	**0.1090**	**4.0000e-004**	**0.0516**	**2.9000e-004**	**0.0519**	**0.0137**	**2.6000e-004**	**0.0140**	**0.0000**	**35.8232**	**35.8232**	**6.5000e-004**	**0.0000**	**35.8395**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Research & Development	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Research & Development	16.60	8.40	6.90	33.00	48.00	19.00	82	15	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Research & Development	0.565475	0.033834	0.192058	0.100675	0.009211	0.004032	0.016699	0.069908	0.001423	0.001062	0.004327	0.000756	0.000539

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	7,275.0639	7,275.0639	0.3004	0.0621	7,301.0906
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	7,781.0219	7,781.0219	0.3212	0.0665	7,808.8588
NaturalGas Mitigated	0.3617	3.2884	2.7623	0.0197		0.2499	0.2499		0.2499	0.2499	0.0000	3,579.8626	3,579.8626	0.0686	0.0656	3,601.1360
NaturalGas Unmitigated	0.4215	3.8319	3.2188	0.0230		0.2912	0.2912		0.2912	0.2912	0.0000	4,171.4991	4,171.4991	0.0800	0.0765	4,196.2882

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Research & Development	7.81709e+007	0.4215	3.8319	3.2188	0.0230		0.2912	0.2912		0.2912	0.2912	0.0000	4,171.4991	4,171.4991	0.0800	0.0765	4,196.2882
Total		**0.4215**	**3.8319**	**3.2188**	**0.0230**		**0.2912**	**0.2912**		**0.2912**	**0.2912**	**0.0000**	**4,171.4991**	**4,171.4991**	**0.0800**	**0.0765**	**4,196.2882**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Research & Development	6.70841e+007	0.3617	3.2884	2.7623	0.0197		0.2499	0.2499		0.2499	0.2499	0.0000	3,579.8626	3,579.8626	0.0686	0.0656	3,601.1360

Total		**0.3617**	**3.2884**	**2.7623**	**0.0197**		**0.2499**	**0.2499**		**0.2499**	**0.2499**	**0.0000**	**3,579.8626**	**3,579.8626**	**0.0686**	**0.0656**	**3,601.1360**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Research & Development	2.44209e+007	7,781.0219	0.3212	0.0665	7,808.8588
Total		**7,781.0219**	**0.3212**	**0.0665**	**7,808.8588**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Research & Development	2.28329e+007	7,275.0639	0.3004	0.0621	7,301.0906
Total		**7,275.0639**	**0.3004**	**0.0621**	**7,301.0906**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	9.8121	2.7000e-004	0.0305	0.0000		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004	0.0000	0.0597	0.0597	1.5000e-004	0.0000	0.0636
Unmitigated	9.8121	2.7000e-004	0.0305	0.0000		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004	0.0000	0.0597	0.0597	1.5000e-004	0.0000	0.0636

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	1.1152					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	8.6941					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.7900e-003	2.7000e-004	0.0305	0.0000		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004	0.0000	0.0597	0.0597	1.5000e-004	0.0000	0.0636
Total	**9.8121**	**2.7000e-004**	**0.0305**	**0.0000**		**1.1000e-004**	**1.1000e-004**		**1.1000e-004**	**1.1000e-004**	**0.0000**	**0.0597**	**0.0597**	**1.5000e-004**	**0.0000**	**0.0636**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	1.1152					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	8.6941					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.7900e-003	2.7000e-004	0.0305	0.0000		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004	0.0000	0.0597	0.0597	1.5000e-004	0.0000	0.0636
Total	**9.8121**	**2.7000e-004**	**0.0305**	**0.0000**		**1.1000e-004**	**1.1000e-004**		**1.1000e-004**	**1.1000e-004**	**0.0000**	**0.0597**	**0.0597**	**1.5000e-004**	**0.0000**	**0.0636**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	5,283.3756	38.7512	0.9521	6,535.8931
Unmitigated	5,283.3756	38.7512	0.9521	6,535.8931

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e

Land Use	Mgal	MT/yr			
Research & Development	1183.02 / 0	5,283.3756	38.7512	0.9521	6,535.8931
Total		**5,283.3756**	**38.7512**	**0.9521**	**6,535.8931**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Research & Development	1183.02 / 0	5,283.3756	38.7512	0.9521	6,535.8931
Total		**5,283.3756**	**38.7512**	**0.9521**	**6,535.8931**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			

Mitigated	37.1149	2.1934	0.0000	91.9505
Unmitigated	37.1149	2.1934	0.0000	91.9505

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Research & Development	182.84	37.1149	2.1934	0.0000	91.9505
Total		**37.1149**	**2.1934**	**0.0000**	**91.9505**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Research & Development	182.84	37.1149	2.1934	0.0000	91.9505
Total		**37.1149**	**2.1934**	**0.0000**	**91.9505**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

City of Murrieta General Plan Update - Non-Residential

Riverside-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Research & Development	2,406.00	1000sqft	55.23	2,406,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2035
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - GP Update will reduce 2,405,600 SF in non-residential uses.

Construction Phase -

Grading -

Vehicle Trips - On-road transportation analyzed in seperate CalEEMod run

Woodstoves -

Energy Mitigation - Increased efficiency to meet 2019 Title 24 Standards

Table Name	Column Name	Default Value	New Value

tblVehicleTrips	ST_TR	1.90	0.00
tblVehicleTrips	SU_TR	1.11	0.00
tblVehicleTrips	WD_TR	8.11	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	4.8490	54.5878	34.2653	0.0643	18.2675	2.3916	20.6591	9.9840	2.2003	12.1843	0.0000	6,367.5239	6,367.5239	1.9490	0.0000	6,416.2491
2020	7.1364	62.0427	55.3124	0.2150	11.1298	2.1753	12.5296	3.6558	2.0012	5.6570	0.0000	21,885.7434	21,885.7434	1.9481	0.0000	21,927.0961
2021	6.4713	55.9722	51.5482	0.2113	11.1297	1.0787	12.2084	3.0090	1.0143	4.0233	0.0000	21,518.0362	21,518.0362	1.5817	0.0000	21,557.5790
2022	5.9785	51.8866	48.6717	0.2074	11.1296	0.9167	12.0463	3.0089	0.8624	3.8713	0.0000	21,127.8001	21,127.8001	1.5170	0.0000	21,165.7247
2023	5.4322	41.9395	45.8099	0.2016	11.1295	0.7740	11.9035	3.0089	0.7277	3.7366	0.0000	20,544.5914	20,544.5914	1.3252	0.0000	20,577.7210
2024	298.1658	40.7008	44.0403	0.1985	11.1294	0.6869	11.8163	3.0089	0.6456	3.6544	0.0000	20,233.1620	20,233.1620	1.2956	0.0000	20,265.5531
2025	298.1227	1.4242	6.0259	0.0171	1.7214	0.0609	1.7822	0.4565	0.0601	0.5167	0.0000	1,688.2289	1,688.2289	0.0414	0.0000	1,689.2641
Maximum	**298.1658**	**62.0427**	**55.3124**	**0.2150**	**18.2675**	**2.3916**	**20.6591**	**9.9840**	**2.2003**	**12.1843**	**0.0000**	**21,885.7434**	**21,885.7434**	**1.9490**	**0.0000**	**21,927.0961**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	4.8490	54.5878	34.2653	0.0643	18.2675	2.3916	20.6591	9.9840	2.2003	12.1843	0.0000	6,367.5239	6,367.5239	1.9490	0.0000	6,416.2491
2020	7.1364	62.0427	55.3124	0.2150	11.1298	2.1753	12.5296	3.6558	2.0012	5.6570	0.0000	21,885.7434	21,885.7434	1.9481	0.0000	21,927.0961
2021	6.4713	55.9722	51.5482	0.2113	11.1297	1.0787	12.2084	3.0090	1.0143	4.0233	0.0000	21,518.0362	21,518.0362	1.5817	0.0000	21,557.5790
2022	5.9785	51.8866	48.6717	0.2074	11.1296	0.9167	12.0463	3.0089	0.8624	3.8713	0.0000	21,127.8001	21,127.8001	1.5170	0.0000	21,165.7247
2023	5.4322	41.9395	45.8099	0.2016	11.1295	0.7740	11.9035	3.0089	0.7277	3.7366	0.0000	20,544.5914	20,544.5914	1.3252	0.0000	20,577.7210
2024	298.1658	40.7008	44.0403	0.1985	11.1294	0.6869	11.8163	3.0089	0.6456	3.6544	0.0000	20,233.1620	20,233.1620	1.2956	0.0000	20,265.5531
2025	298.1227	1.4242	6.0259	0.0171	1.7214	0.0609	1.7822	0.4565	0.0601	0.5167	0.0000	1,688.2289	1,688.2289	0.0414	0.0000	1,689.2641
Maximum	**298.1658**	**62.0427**	**55.3124**	**0.2150**	**18.2675**	**2.3916**	**20.6591**	**9.9840**	**2.2003**	**12.1843**	**0.0000**	**21,885.7434**	**21,885.7434**	**1.9490**	**0.0000**	**21,927.0961**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	53.7717	2.1900e-003	0.2443	2.0000e-005		8.7000e-004	8.7000e-004		8.7000e-004	8.7000e-004		0.5266	0.5266	1.3600e-003		0.5605
Energy	2.3096	20.9968	17.6373	0.1260		1.5958	1.5958		1.5958	1.5958		25,196.1128	25,196.1128	0.4829	0.4619	25,345.8407
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**56.0814**	**20.9990**	**17.8815**	**0.1260**	**0.0000**	**1.5966**	**1.5966**	**0.0000**	**1.5966**	**1.5966**		**25,196.6394**	**25,196.6394**	**0.4843**	**0.4619**	**25,346.4012**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	53.7717	2.1900e-003	0.2443	2.0000e-005		8.7000e-004	8.7000e-004		8.7000e-004	8.7000e-004		0.5266	0.5266	1.3600e-003		0.5605
Energy	1.9821	18.0188	15.1358	0.1081		1.3694	1.3694		1.3694	1.3694		21,622.5921	21,622.5921	0.4144	0.3964	21,751.0844
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**55.7538**	**18.0210**	**15.3801**	**0.1081**	**0.0000**	**1.3703**	**1.3703**	**0.0000**	**1.3703**	**1.3703**		**21,623.1187**	**21,623.1187**	**0.4158**	**0.3964**	**21,751.6448**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.58**	**14.18**	**13.99**	**14.18**	**0.00**	**14.17**	**14.17**	**0.00**	**14.17**	**14.17**	**0.00**	**14.18**	**14.18**	**14.14**	**14.18**	**14.18**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	7/25/2019	10/30/2019	5	70	
2	Site Preparation	Site Preparation	10/31/2019	12/25/2019	5	40	
3	Grading	Grading	12/26/2019	5/27/2020	5	110	
4	Building Construction	Building Construction	5/28/2020	8/28/2024	5	1110	
5	Paving	Paving	8/29/2024	12/11/2024	5	75	
6	Architectural Coating	Architectural Coating	12/12/2024	3/26/2025	5	75	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 275

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 3,609,000; Non-Residential Outdoor: 1,203,000; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38

Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	770.00	394.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	154.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.5134	35.7830	22.0600	0.0388		1.7949	1.7949		1.6697	1.6697		3,816.8994	3,816.8994	1.0618		3,843.4451
Total	**3.5134**	**35.7830**	**22.0600**	**0.0388**		**1.7949**	**1.7949**		**1.6697**	**1.6697**		**3,816.8994**	**3,816.8994**	**1.0618**		**3,843.4451**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0826	0.0507	0.6664	1.7100e-003	0.1677	1.0300e-003	0.1687	0.0445	9.5000e-004	0.0454		170.6284	170.6284	4.7800e-003		170.7478
Total	**0.0826**	**0.0507**	**0.6664**	**1.7100e-003**	**0.1677**	**1.0300e-003**	**0.1687**	**0.0445**	**9.5000e-004**	**0.0454**		**170.6284**	**170.6284**	**4.7800e-003**		**170.7478**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.5134	35.7830	22.0600	0.0388		1.7949	1.7949		1.6697	1.6697	0.0000	3,816.8994	3,816.8994	1.0618		3,843.4451
Total	**3.5134**	**35.7830**	**22.0600**	**0.0388**		**1.7949**	**1.7949**		**1.6697**	**1.6697**	**0.0000**	**3,816.8994**	**3,816.8994**	**1.0618**		**3,843.4451**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0826	0.0507	0.6664	1.7100e-003	0.1677	1.0300e-003	0.1687	0.0445	9.5000e-004	0.0454		170.6284	170.6284	4.7800e-003		170.7478
Total	**0.0826**	**0.0507**	**0.6664**	**1.7100e-003**	**0.1677**	**1.0300e-003**	**0.1687**	**0.0445**	**9.5000e-004**	**0.0454**		**170.6284**	**170.6284**	**4.7800e-003**		**170.7478**

3.3 Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.3350	45.5727	22.0630	0.0380		2.3904	2.3904		2.1991	2.1991		3,766.4529	3,766.4529	1.1917		3,796.2445
Total	**4.3350**	**45.5727**	**22.0630**	**0.0380**	**18.0663**	**2.3904**	**20.4566**	**9.9307**	**2.1991**	**12.1298**		**3,766.4529**	**3,766.4529**	**1.1917**		**3,796.2445**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0991	0.0608	0.7997	2.0600e-003	0.2012	1.2400e-003	0.2024	0.0534	1.1400e-003	0.0545		204.7540	204.7540	5.7300e-003		204.8973
Total	**0.0991**	**0.0608**	**0.7997**	**2.0600e-003**	**0.2012**	**1.2400e-003**	**0.2024**	**0.0534**	**1.1400e-003**	**0.0545**		**204.7540**	**204.7540**	**5.7300e-003**		**204.8973**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.3350	45.5727	22.0630	0.0380		2.3904	2.3904		2.1991	2.1991	0.0000	3,766.4529	3,766.4529	1.1917		3,796.2445
Total	**4.3350**	**45.5727**	**22.0630**	**0.0380**	**18.0663**	**2.3904**	**20.4566**	**9.9307**	**2.1991**	**12.1298**	**0.0000**	**3,766.4529**	**3,766.4529**	**1.1917**		**3,796.2445**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0991	0.0608	0.7997	2.0600e-003	0.2012	1.2400e-003	0.2024	0.0534	1.1400e-003	0.0545		204.7540	204.7540	5.7300e-003		204.8973
Total	**0.0991**	**0.0608**	**0.7997**	**2.0600e-003**	**0.2012**	**1.2400e-003**	**0.2024**	**0.0534**	**1.1400e-003**	**0.0545**		**204.7540**	**204.7540**	**5.7300e-003**		**204.8973**

3.4 Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	4.7389	54.5202	33.3768	0.0620		2.3827	2.3827		2.1920	2.1920		6,140.0195	6,140.0195	1.9426		6,188.5854
Total	**4.7389**	**54.5202**	**33.3768**	**0.0620**	**8.6733**	**2.3827**	**11.0560**	**3.5965**	**2.1920**	**5.7885**		**6,140.0195**	**6,140.0195**	**1.9426**		**6,188.5854**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1101	0.0676	0.8885	2.2900e-003	0.2236	1.3800e-003	0.2249	0.0593	1.2700e-003	0.0606		227.5045	227.5045	6.3700e-003		227.6637
Total	**0.1101**	**0.0676**	**0.8885**	**2.2900e-003**	**0.2236**	**1.3800e-003**	**0.2249**	**0.0593**	**1.2700e-003**	**0.0606**		**227.5045**	**227.5045**	**6.3700e-003**		**227.6637**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	4.7389	54.5202	33.3768	0.0620		2.3827	2.3827		2.1920	2.1920	0.0000	6,140.0195	6,140.0195	1.9426		6,188.5854
Total	**4.7389**	**54.5202**	**33.3768**	**0.0620**	**8.6733**	**2.3827**	**11.0560**	**3.5965**	**2.1920**	**5.7885**	**0.0000**	**6,140.0195**	**6,140.0195**	**1.9426**		**6,188.5854**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1101	0.0676	0.8885	2.2900e-003	0.2236	1.3800e-003	0.2249	0.0593	1.2700e-003	0.0606		227.5045	227.5045	6.3700e-003		227.6637
Total	**0.1101**	**0.0676**	**0.8885**	**2.2900e-003**	**0.2236**	**1.3800e-003**	**0.2249**	**0.0593**	**1.2700e-003**	**0.0606**		**227.5045**	**227.5045**	**6.3700e-003**		**227.6637**

3.4 Grading - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	4.4501	50.1975	31.9583	0.0620		2.1739	2.1739		2.0000	2.0000		6,005.8653	6,005.8653	1.9424		6,054.4257
Total	**4.4501**	**50.1975**	**31.9583**	**0.0620**	**8.6733**	**2.1739**	**10.8472**	**3.5965**	**2.0000**	**5.5965**		**6,005.8653**	**6,005.8653**	**1.9424**		**6,054.4257**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1018	0.0602	0.8064	2.2100e-003	0.2236	1.3500e-003	0.2249	0.0593	1.2500e-003	0.0605		220.3189	220.3189	5.6500e-003		220.4601
Total	**0.1018**	**0.0602**	**0.8064**	**2.2100e-003**	**0.2236**	**1.3500e-003**	**0.2249**	**0.0593**	**1.2500e-003**	**0.0605**		**220.3189**	**220.3189**	**5.6500e-003**		**220.4601**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	4.4501	50.1975	31.9583	0.0620		2.1739	2.1739		2.0000	2.0000	0.0000	6,005.8653	6,005.8653	1.9424		6,054.4257
Total	**4.4501**	**50.1975**	**31.9583**	**0.0620**	**8.6733**	**2.1739**	**10.8472**	**3.5965**	**2.0000**	**5.5965**	**0.0000**	**6,005.8653**	**6,005.8653**	**1.9424**		**6,054.4257**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1018	0.0602	0.8064	2.2100e-003	0.2236	1.3500e-003	0.2249	0.0593	1.2500e-003	0.0605		220.3189	220.3189	5.6500e-003		220.4601
Total	**0.1018**	**0.0602**	**0.8064**	**2.2100e-003**	**0.2236**	**1.3500e-003**	**0.2249**	**0.0593**	**1.2500e-003**	**0.0605**		**220.3189**	**220.3189**	**5.6500e-003**		**220.4601**

3.5 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.1198	19.1860	16.8485	0.0269		1.1171	1.1171		1.0503	1.0503		2,553.0631	2,553.0631	0.6229		2,568.6345
Total	**2.1198**	**19.1860**	**16.8485**	**0.0269**		**1.1171**	**1.1171**		**1.0503**	**1.0503**		**2,553.0631**	**2,553.0631**	**0.6229**		**2,568.6345**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	1.0982	40.5394	7.4164	0.1029	2.5230	0.2306	2.7536	0.7264	0.2206	0.9470		10,850.4024	10,850.4024	0.8138		10,870.7481
Worker	3.9184	2.3173	31.0476	0.0852	8.6068	0.0521	8.6589	2.2826	0.0480	2.3306		8,482.2780	8,482.2780	0.2174		8,487.7135
Total	**5.0165**	**42.8567**	**38.4639**	**0.1881**	**11.1298**	**0.2827**	**11.4125**	**3.0090**	**0.2686**	**3.2776**		**19,332.6803**	**19,332.6803**	**1.0313**		**19,358.4616**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.1198	19.1860	16.8485	0.0269		1.1171	1.1171		1.0503	1.0503	0.0000	2,553.0631	2,553.0631	0.6229		2,568.6345
Total	**2.1198**	**19.1860**	**16.8485**	**0.0269**		**1.1171**	**1.1171**		**1.0503**	**1.0503**	**0.0000**	**2,553.0631**	**2,553.0631**	**0.6229**		**2,568.6345**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	1.0982	40.5394	7.4164	0.1029	2.5230	0.2306	2.7536	0.7264	0.2206	0.9470		10,850.4024	10,850.4024	0.8138		10,870.7481
Worker	3.9184	2.3173	31.0476	0.0852	8.6068	0.0521	8.6589	2.2826	0.0480	2.3306		8,482.2780	8,482.2780	0.2174		8,487.7135
Total	**5.0165**	**42.8567**	**38.4639**	**0.1881**	**11.1298**	**0.2827**	**11.4125**	**3.0090**	**0.2686**	**3.2776**		**19,332.6803**	**19,332.6803**	**1.0313**		**19,358.4616**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013		2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**		**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.9198	36.4604	6.5052	0.1021	2.5229	0.0694	2.5923	0.7264	0.0663	0.7927		10,766.0903	10,766.0903	0.7702		10,785.3455
Worker	3.6505	2.0797	28.4678	0.0823	8.6068	0.0507	8.6575	2.2826	0.0467	2.3293		8,198.5820	8,198.5820	0.1955		8,203.4692
Total	**4.5704**	**38.5401**	**34.9730**	**0.1844**	**11.1297**	**0.1201**	**11.2498**	**3.0090**	**0.1130**	**3.1220**		**18,964.6723**	**18,964.6723**	**0.9657**		**18,988.8147**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013	0.0000	2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**	**0.0000**	**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.9198	36.4604	6.5052	0.1021	2.5229	0.0694	2.5923	0.7264	0.0663	0.7927		10,766.0903	10,766.0903	0.7702		10,785.3455
Worker	3.6505	2.0797	28.4678	0.0823	8.6068	0.0507	8.6575	2.2826	0.0467	2.3293		8,198.5820	8,198.5820	0.1955		8,203.4692
Total	**4.5704**	**38.5401**	**34.9730**	**0.1844**	**11.1297**	**0.1201**	**11.2498**	**3.0090**	**0.1130**	**3.1220**		**18,964.6723**	**18,964.6723**	**0.9657**		**18,988.8147**

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612		2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**		**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.8577	34.3993	6.0505	0.1012	2.5228	0.0583	2.5811	0.7264	0.0558	0.7821		10,674.4520	10,674.4520	0.7294		10,692.6881
Worker	3.4146	1.8716	26.2578	0.0793	8.6068	0.0494	8.6562	2.2826	0.0455	2.3280		7,899.0145	7,899.0145	0.1756		7,903.4044
Total	**4.2723**	**36.2709**	**32.3083**	**0.1804**	**11.1296**	**0.1077**	**11.2373**	**3.0089**	**0.1012**	**3.1101**		**18,573.4665**	**18,573.4665**	**0.9050**		**18,596.0925**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612	0.0000	2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**	**0.0000**	**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.8577	34.3993	6.0505	0.1012	2.5228	0.0583	2.5811	0.7264	0.0558	0.7821		10,674.4520	10,674.4520	0.7294		10,692.6881
Worker	3.4146	1.8716	26.2578	0.0793	8.6068	0.0494	8.6562	2.2826	0.0455	2.3280		7,899.0145	7,899.0145	0.1756		7,903.4044
Total	**4.2723**	**36.2709**	**32.3083**	**0.1804**	**11.1296**	**0.1077**	**11.2373**	**3.0089**	**0.1012**	**3.1101**		**18,573.4665**	**18,573.4665**	**0.9050**		**18,596.0925**

3.5 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5728	14.3849	16.2440	0.0269		0.6997	0.6997		0.6584	0.6584		2,555.2099	2,555.2099	0.6079		2,570.4061
Total	**1.5728**	**14.3849**	**16.2440**	**0.0269**		**0.6997**	**0.6997**		**0.6584**	**0.6584**		**2,555.2099**	**2,555.2099**	**0.6079**		**2,570.4061**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.6578	25.8668	5.3331	0.0984	2.5227	0.0260	2.5487	0.7263	0.0249	0.7512		10,390.5501	10,390.5501	0.5597		10,404.5433
Worker	3.2016	1.6878	24.2328	0.0762	8.6068	0.0482	8.6550	2.2826	0.0444	2.3269		7,598.8313	7,598.8313	0.1576		7,602.7716
Total	**3.8594**	**27.5546**	**29.5659**	**0.1747**	**11.1295**	**0.0742**	**11.2037**	**3.0089**	**0.0693**	**3.0781**		**17,989.3815**	**17,989.3815**	**0.7173**		**18,007.3149**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5728	14.3849	16.2440	0.0269		0.6997	0.6997		0.6584	0.6584	0.0000	2,555.2099	2,555.2099	0.6079		2,570.4061
Total	**1.5728**	**14.3849**	**16.2440**	**0.0269**		**0.6997**	**0.6997**		**0.6584**	**0.6584**	**0.0000**	**2,555.2099**	**2,555.2099**	**0.6079**		**2,570.4061**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.6578	25.8668	5.3331	0.0984	2.5227	0.0260	2.5487	0.7263	0.0249	0.7512		10,390.5501	10,390.5501	0.5597		10,404.5433
Worker	3.2016	1.6878	24.2328	0.0762	8.6068	0.0482	8.6550	2.2826	0.0444	2.3269		7,598.8313	7,598.8313	0.1576		7,602.7716
Total	**3.8594**	**27.5546**	**29.5659**	**0.1747**	**11.1295**	**0.0742**	**11.2037**	**3.0089**	**0.0693**	**3.0781**		**17,989.3815**	**17,989.3815**	**0.7173**		**18,007.3149**

3.5 Building Construction - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4716	13.4438	16.1668	0.0270		0.6133	0.6133		0.5769	0.5769		2,555.6989	2,555.6989	0.6044		2,570.8077
Total	**1.4716**	**13.4438**	**16.1668**	**0.0270**		**0.6133**	**0.6133**		**0.5769**	**0.5769**		**2,555.6989**	**2,555.6989**	**0.6044**		**2,570.8077**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.6451	25.7265	5.1517	0.0980	2.5226	0.0259	2.5485	0.7263	0.0248	0.7510		10,349.9008	10,349.9008	0.5476		10,363.5902
Worker	3.0172	1.5305	22.7217	0.0735	8.6068	0.0477	8.6545	2.2826	0.0439	2.3265		7,327.5623	7,327.5623	0.1437		7,331.1553
Total	**3.6624**	**27.2570**	**27.8734**	**0.1715**	**11.1294**	**0.0736**	**11.2030**	**3.0089**	**0.0687**	**3.0775**		**17,677.4631**	**17,677.4631**	**0.6913**		**17,694.7455**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4716	13.4438	16.1668	0.0270		0.6133	0.6133		0.5769	0.5769	0.0000	2,555.6989	2,555.6989	0.6044		2,570.8077
Total	**1.4716**	**13.4438**	**16.1668**	**0.0270**		**0.6133**	**0.6133**		**0.5769**	**0.5769**	**0.0000**	**2,555.6989**	**2,555.6989**	**0.6044**		**2,570.8077**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.6451	25.7265	5.1517	0.0980	2.5226	0.0259	2.5485	0.7263	0.0248	0.7510		10,349.9008	10,349.9008	0.5476		10,363.5902
Worker	3.0172	1.5305	22.7217	0.0735	8.6068	0.0477	8.6545	2.2826	0.0439	2.3265		7,327.5623	7,327.5623	0.1437		7,331.1553
Total	**3.6624**	**27.2570**	**27.8734**	**0.1715**	**11.1294**	**0.0736**	**11.2030**	**3.0089**	**0.0687**	**3.0775**		**17,677.4631**	**17,677.4631**	**0.6913**		**17,694.7455**

3.6 Paving - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9882	9.5246	14.6258	0.0228		0.4685	0.4685		0.4310	0.4310		2,207.5472	2,207.5472	0.7140		2,225.3963
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9882**	**9.5246**	**14.6258**	**0.0228**		**0.4685**	**0.4685**		**0.4310**	**0.4310**		**2,207.5472**	**2,207.5472**	**0.7140**		**2,225.3963**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0588	0.0298	0.4426	1.4300e-003	0.1677	9.3000e-004	0.1686	0.0445	8.6000e-004	0.0453		142.7447	142.7447	2.8000e-003		142.8147
Total	**0.0588**	**0.0298**	**0.4426**	**1.4300e-003**	**0.1677**	**9.3000e-004**	**0.1686**	**0.0445**	**8.6000e-004**	**0.0453**		**142.7447**	**142.7447**	**2.8000e-003**		**142.8147**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9882	9.5246	14.6258	0.0228		0.4685	0.4685		0.4310	0.4310	0.0000	2,207.5472	2,207.5472	0.7140		2,225.3963
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9882**	**9.5246**	**14.6258**	**0.0228**		**0.4685**	**0.4685**		**0.4310**	**0.4310**	**0.0000**	**2,207.5472**	**2,207.5472**	**0.7140**		**2,225.3963**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0588	0.0298	0.4426	1.4300e-003	0.1677	9.3000e-004	0.1686	0.0445	8.6000e-004	0.0453		142.7447	142.7447	2.8000e-003		142.8147
Total	**0.0588**	**0.0298**	**0.4426**	**1.4300e-003**	**0.1677**	**9.3000e-004**	**0.1686**	**0.0445**	**8.6000e-004**	**0.0453**		**142.7447**	**142.7447**	**2.8000e-003**		**142.8147**

3.7 Architectural Coating - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	297.3816					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1808	1.2188	1.8101	2.9700e-003		0.0609	0.0609		0.0609	0.0609		281.4481	281.4481	0.0159		281.8443
Total	**297.5624**	**1.2188**	**1.8101**	**2.9700e-003**		**0.0609**	**0.0609**		**0.0609**	**0.0609**		**281.4481**	**281.4481**	**0.0159**		**281.8443**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.6035	0.3061	4.5444	0.0147	1.7214	9.5400e-003	1.7309	0.4565	8.7800e-003	0.4653		1,465.5125	1,465.5125	0.0287		1,466.2311
Total	**0.6035**	**0.3061**	**4.5444**	**0.0147**	**1.7214**	**9.5400e-003**	**1.7309**	**0.4565**	**8.7800e-003**	**0.4653**		**1,465.5125**	**1,465.5125**	**0.0287**		**1,466.2311**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	297.3816					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1808	1.2188	1.8101	2.9700e-003		0.0609	0.0609		0.0609	0.0609	0.0000	281.4481	281.4481	0.0159		281.8443
Total	**297.5624**	**1.2188**	**1.8101**	**2.9700e-003**		**0.0609**	**0.0609**		**0.0609**	**0.0609**	**0.0000**	**281.4481**	**281.4481**	**0.0159**		**281.8443**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.6035	0.3061	4.5444	0.0147	1.7214	9.5400e-003	1.7309	0.4565	8.7800e-003	0.4653		1,465.5125	1,465.5125	0.0287		1,466.2311
Total	**0.6035**	**0.3061**	**4.5444**	**0.0147**	**1.7214**	**9.5400e-003**	**1.7309**	**0.4565**	**8.7800e-003**	**0.4653**		**1,465.5125**	**1,465.5125**	**0.0287**		**1,466.2311**

3.7 Architectural Coating - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	297.3816					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515		281.4481	281.4481	0.0154		281.8319
Total	**297.5525**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**		**281.4481**	**281.4481**	**0.0154**		**281.8319**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.5702	0.2787	4.2167	0.0141	1.7214	9.3700e-003	1.7307	0.4565	8.6200e-003	0.4651		1,406.7809	1,406.7809	0.0261		1,407.4323
Total	**0.5702**	**0.2787**	**4.2167**	**0.0141**	**1.7214**	**9.3700e-003**	**1.7307**	**0.4565**	**8.6200e-003**	**0.4651**		**1,406.7809**	**1,406.7809**	**0.0261**		**1,407.4323**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	297.3816					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515	0.0000	281.4481	281.4481	0.0154		281.8319
Total	**297.5525**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**	**0.0000**	**281.4481**	**281.4481**	**0.0154**		**281.8319**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.5702	0.2787	4.2167	0.0141	1.7214	9.3700e-003	1.7307	0.4565	8.6200e-003	0.4651		1,406.7809	1,406.7809	0.0261		1,407.4323
Total	**0.5702**	**0.2787**	**4.2167**	**0.0141**	**1.7214**	**9.3700e-003**	**1.7307**	**0.4565**	**8.6200e-003**	**0.4651**		**1,406.7809**	**1,406.7809**	**0.0261**		**1,407.4323**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Research & Development	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Research & Development	16.60	8.40	6.90	33.00	48.00	19.00	82	15	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Research & Development	0.565475	0.033834	0.192058	0.100675	0.009211	0.004032	0.016699	0.069908	0.001423	0.001062	0.004327	0.000756	0.000539

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	1.9821	18.0188	15.1358	0.1081		1.3694	1.3694		1.3694	1.3694		21,622.5921	21,622.5921	0.4144	0.3964	21,751.0844
NaturalGas Unmitigated	2.3096	20.9968	17.6373	0.1260		1.5958	1.5958		1.5958	1.5958		25,196.1128	25,196.1128	0.4829	0.4619	25,345.8407

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Research & Development	214167	2.3096	20.9968	17.6373	0.1260		1.5958	1.5958		1.5958	1.5958		25,196.1128	25,196.1128	0.4829	0.4619	25,345.8407
Total		**2.3096**	**20.9968**	**17.6373**	**0.1260**		**1.5958**	**1.5958**		**1.5958**	**1.5958**		**25,196.1128**	**25,196.1128**	**0.4829**	**0.4619**	**25,345.8407**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Research & Development	183.792	1.9821	18.0188	15.1358	0.1081		1.3694	1.3694		1.3694	1.3694		21,622.5921	21,622.5921	0.4144	0.3964	21,751.0844
Total		**1.9821**	**18.0188**	**15.1358**	**0.1081**		**1.3694**	**1.3694**		**1.3694**	**1.3694**		**21,622.5921**	**21,622.5921**	**0.4144**	**0.3964**	**21,751.0844**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	53.7717	2.1900e-003	0.2443	2.0000e-005		8.7000e-004	8.7000e-004		8.7000e-004	8.7000e-004		0.5266	0.5266	1.3600e-003		0.5605
Unmitigated	53.7717	2.1900e-003	0.2443	2.0000e-005		8.7000e-004	8.7000e-004		8.7000e-004	8.7000e-004		0.5266	0.5266	1.3600e-003		0.5605

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	6.1106					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	47.6388					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0223	2.1900e-003	0.2443	2.0000e-005		8.7000e-004	8.7000e-004		8.7000e-004	8.7000e-004		0.5266	0.5266	1.3600e-003		0.5605
Total	**53.7717**	**2.1900e-003**	**0.2443**	**2.0000e-005**		**8.7000e-004**	**8.7000e-004**		**8.7000e-004**	**8.7000e-004**		**0.5266**	**0.5266**	**1.3600e-003**		**0.5605**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	6.1106					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	47.6388					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0223	2.1900e-003	0.2443	2.0000e-005		8.7000e-004	8.7000e-004		8.7000e-004	8.7000e-004		0.5266	0.5266	1.3600e-003		0.5605
Total	**53.7717**	**2.1900e-003**	**0.2443**	**2.0000e-005**		**8.7000e-004**	**8.7000e-004**		**8.7000e-004**	**8.7000e-004**		**0.5266**	**0.5266**	**1.3600e-003**		**0.5605**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Existing VMT Operations CalEEMod Output

City of Murrieta General Plan Update - Existing VMT

Riverside-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments Mid Rise	1,572.00	Dwelling Unit	41.37	1,572,000.00	4496

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2035
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Vehicle Trips - Adjusted trip rate to meet annual VMT provided by VRPA

Table Name	Column Name	Default Value	New Value
tblVehicleTrips	ST_TR	6.39	354.91
tblVehicleTrips	SU_TR	5.86	325.48
tblVehicleTrips	WD_TR	6.65	369.35

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.2335	2.4540	1.4531	2.6300e-003	0.4774	0.1189	0.5963	0.2155	0.1099	0.3253	0.0000	236.1047	236.1047	0.0688	0.0000	237.8233
2020	0.9517	5.4941	7.1833	0.0217	1.7122	0.1883	1.9005	0.4785	0.1761	0.6546	0.0000	1,966.9150	1,966.9150	0.1646	0.0000	1,971.0289
2021	0.9337	4.7460	7.2068	0.0236	1.7622	0.1387	1.9009	0.4711	0.1303	0.6014	0.0000	2,150.2307	2,150.2307	0.1443	0.0000	2,153.8386
2022	0.8616	4.3311	6.7598	0.0230	1.7554	0.1179	1.8733	0.4693	0.1108	0.5801	0.0000	2,089.7914	2,089.7914	0.1381	0.0000	2,093.2431
2023	4.9769	0.3316	0.6280	1.3100e-003	0.0728	0.0164	0.0892	0.0193	0.0152	0.0346	0.0000	116.6998	116.6998	0.0193	0.0000	117.1833
Maximum	**4.9769**	**5.4941**	**7.2068**	**0.0236**	**1.7622**	**0.1883**	**1.9009**	**0.4785**	**0.1761**	**0.6546**	**0.0000**	**2,150.2307**	**2,150.2307**	**0.1646**	**0.0000**	**2,153.8386**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.2335	2.4540	1.4531	2.6300e-003	0.4774	0.1189	0.5963	0.2155	0.1099	0.3253	0.0000	236.1044	236.1044	0.0688	0.0000	237.8231
2020	0.9517	5.4941	7.1833	0.0217	1.7122	0.1883	1.9005	0.4785	0.1761	0.6546	0.0000	1,966.9145	1,966.9145	0.1646	0.0000	1,971.0285
2021	0.9337	4.7459	7.2068	0.0236	1.7622	0.1387	1.9009	0.4711	0.1303	0.6014	0.0000	2,150.2303	2,150.2303	0.1443	0.0000	2,153.8383
2022	0.8616	4.3311	6.7598	0.0230	1.7554	0.1179	1.8733	0.4693	0.1108	0.5801	0.0000	2,089.7911	2,089.7911	0.1381	0.0000	2,093.2427

2023	4.9769	0.3316	0.6280	1.3100e-003	0.0728	0.0164	0.0892	0.0193	0.0152	0.0346	0.0000	116.6997	116.6997	0.0193	0.0000	117.1832
Maximum	**4.9769**	**5.4941**	**7.2068**	**0.0236**	**1.7622**	**0.1883**	**1.9009**	**0.4785**	**0.1761**	**0.6546**	**0.0000**	**2,150.2303**	**2,150.2303**	**0.1646**	**0.0000**	**2,153.8383**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	7-29-2019	10-28-2019	1.3867	1.3867
2	10-29-2019	1-28-2020	1.8464	1.8464
3	1-29-2020	4-28-2020	1.6395	1.6395
4	4-29-2020	7-28-2020	1.5674	1.5674
5	7-29-2020	10-28-2020	1.5839	1.5839
6	10-29-2020	1-28-2021	1.5367	1.5367
7	1-29-2021	4-28-2021	1.4022	1.4022
8	4-29-2021	7-28-2021	1.4201	1.4201
9	7-29-2021	10-28-2021	1.4347	1.4347
10	10-29-2021	1-28-2022	1.3965	1.3965
11	1-29-2022	4-28-2022	1.2874	1.2874
12	4-29-2022	7-28-2022	1.3041	1.3041
13	7-29-2022	10-28-2022	1.3174	1.3174
14	10-29-2022	1-28-2023	1.0180	1.0180
15	1-29-2023	4-28-2023	2.9207	2.9207
16	4-29-2023	7-28-2023	2.2722	2.2722
		Highest	2.9207	2.9207

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	11.8043	0.5941	26.1476	0.0264		1.5909	1.5909		1.5909	1.5909	166.9764	347.3524	514.3288	0.5232	0.0113	530.7852
Energy	0.1254	1.0716	0.4560	6.8400e-003		0.0866	0.0866		0.0866	0.0866	0.0000	3,528.8865	3,528.8865	0.1182	0.0423	3,544.4462
Mobile	90.0111	825.3176	1,139.2682	7.4001	739.1551	2.9986	742.1536	197.8315	2.7959	200.6273	0.0000	690,671.8108	690,671.8108	25.0107	0.0000	691,297.0783
Waste						0.0000	0.0000		0.0000	0.0000	146.7868	0.0000	146.7868	8.6749	0.0000	363.6582
Water						0.0000	0.0000		0.0000	0.0000	32.4938	653.4978	685.9916	3.3644	0.0844	795.2487
Total	**101.9407**	**826.9833**	**1,165.8717**	**7.4333**	**739.1551**	**4.6761**	**743.8312**	**197.8315**	**4.4735**	**202.3049**	**346.2570**	**695,201.5475**	**695,547.8045**	**37.6914**	**0.1380**	**696,531.2166**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	11.8043	0.5941	26.1476	0.0264		1.5909	1.5909		1.5909	1.5909	166.9764	347.3524	514.3288	0.5232	0.0113	530.7852
Energy	0.1254	1.0716	0.4560	6.8400e-003		0.0866	0.0866		0.0866	0.0866	0.0000	3,528.8865	3,528.8865	0.1182	0.0423	3,544.4462
Mobile	90.0111	825.3176	1,139.2682	7.4001	739.1551	2.9986	742.1536	197.8315	2.7959	200.6273	0.0000	690,671.8108	690,671.8108	25.0107	0.0000	691,297.0783
Waste						0.0000	0.0000		0.0000	0.0000	146.7868	0.0000	146.7868	8.6749	0.0000	363.6582
Water						0.0000	0.0000		0.0000	0.0000	32.4938	653.4978	685.9916	3.3644	0.0844	795.2487
Total	**101.9407**	**826.9833**	**1,165.8717**	**7.4333**	**739.1551**	**4.6761**	**743.8312**	**197.8315**	**4.4735**	**202.3049**	**346.2570**	**695,201.5475**	**695,547.8045**	**37.6914**	**0.1380**	**696,531.2166**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e

Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	7/29/2019	10/4/2019	5	50	
2	Site Preparation	Site Preparation	10/5/2019	11/15/2019	5	30	
3	Grading	Grading	11/16/2019	2/28/2020	5	75	
4	Building Construction	Building Construction	2/29/2020	12/30/2022	5	740	
5	Paving	Paving	12/31/2022	3/17/2023	5	55	
6	Architectural Coating	Architectural Coating	3/18/2023	6/2/2023	5	55	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 187.5

Acres of Paving: 0

Residential Indoor: 3,183,300; Residential Outdoor: 1,061,100; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48

Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	1,132.00	168.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	226.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Off-Road	0.0878	0.8946	0.5515	9.7000e-004		0.0449	0.0449		0.0417	0.0417	0.0000	86.5658	86.5658	0.0241	0.0000	87.1679
Total	**0.0878**	**0.8946**	**0.5515**	**9.7000e-004**		**0.0449**	**0.0449**		**0.0417**	**0.0417**	**0.0000**	**86.5658**	**86.5658**	**0.0241**	**0.0000**	**87.1679**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.8600e-003	1.3600e-003	0.0142	4.0000e-005	4.1200e-003	3.0000e-005	4.1500e-003	1.0900e-003	2.0000e-005	1.1200e-003	0.0000	3.5610	3.5610	1.0000e-004	0.0000	3.5635
Total	**1.8600e-003**	**1.3600e-003**	**0.0142**	**4.0000e-005**	**4.1200e-003**	**3.0000e-005**	**4.1500e-003**	**1.0900e-003**	**2.0000e-005**	**1.1200e-003**	**0.0000**	**3.5610**	**3.5610**	**1.0000e-004**	**0.0000**	**3.5635**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0878	0.8946	0.5515	9.7000e-004		0.0449	0.0449		0.0417	0.0417	0.0000	86.5657	86.5657	0.0241	0.0000	87.1678
Total	**0.0878**	**0.8946**	**0.5515**	**9.7000e-004**		**0.0449**	**0.0449**		**0.0417**	**0.0417**	**0.0000**	**86.5657**	**86.5657**	**0.0241**	**0.0000**	**87.1678**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.8600e-003	1.3600e-003	0.0142	4.0000e-005	4.1200e-003	3.0000e-005	4.1500e-003	1.0900e-003	2.0000e-005	1.1200e-003	0.0000	3.5610	3.5610	1.0000e-004	0.0000	3.5635
Total	**1.8600e-003**	**1.3600e-003**	**0.0142**	**4.0000e-005**	**4.1200e-003**	**3.0000e-005**	**4.1500e-003**	**1.0900e-003**	**2.0000e-005**	**1.1200e-003**	**0.0000**	**3.5610**	**3.5610**	**1.0000e-004**	**0.0000**	**3.5635**

3.3 Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2710	0.0000	0.2710	0.1490	0.0000	0.1490	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0650	0.6836	0.3310	5.7000e-004		0.0359	0.0359		0.0330	0.0330	0.0000	51.2530	51.2530	0.0162	0.0000	51.6584
Total	**0.0650**	**0.6836**	**0.3310**	**5.7000e-004**	**0.2710**	**0.0359**	**0.3069**	**0.1490**	**0.0330**	**0.1820**	**0.0000**	**51.2530**	**51.2530**	**0.0162**	**0.0000**	**51.6584**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3400e-003	9.8000e-004	0.0102	3.0000e-005	2.9700e-003	2.0000e-005	2.9900e-003	7.9000e-004	2.0000e-005	8.1000e-004	0.0000	2.5639	2.5639	7.0000e-005	0.0000	2.5657
Total	**1.3400e-003**	**9.8000e-004**	**0.0102**	**3.0000e-005**	**2.9700e-003**	**2.0000e-005**	**2.9900e-003**	**7.9000e-004**	**2.0000e-005**	**8.1000e-004**	**0.0000**	**2.5639**	**2.5639**	**7.0000e-005**	**0.0000**	**2.5657**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2710	0.0000	0.2710	0.1490	0.0000	0.1490	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0650	0.6836	0.3309	5.7000e-004		0.0359	0.0359		0.0330	0.0330	0.0000	51.2530	51.2530	0.0162	0.0000	51.6584
Total	**0.0650**	**0.6836**	**0.3309**	**5.7000e-004**	**0.2710**	**0.0359**	**0.3069**	**0.1490**	**0.0330**	**0.1820**	**0.0000**	**51.2530**	**51.2530**	**0.0162**	**0.0000**	**51.6584**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3400e-003	9.8000e-004	0.0102	3.0000e-005	2.9700e-003	2.0000e-005	2.9900e-003	7.9000e-004	2.0000e-005	8.1000e-004	0.0000	2.5639	2.5639	7.0000e-005	0.0000	2.5657
Total	**1.3400e-003**	**9.8000e-004**	**0.0102**	**3.0000e-005**	**2.9700e-003**	**2.0000e-005**	**2.9900e-003**	**7.9000e-004**	**2.0000e-005**	**8.1000e-004**	**0.0000**	**2.5639**	**2.5639**	**7.0000e-005**	**0.0000**	**2.5657**

3.4 Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1958	0.0000	0.1958	0.0637	0.0000	0.0637	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0758	0.8723	0.5340	9.9000e-004		0.0381	0.0381		0.0351	0.0351	0.0000	89.1221	89.1221	0.0282	0.0000	89.8270
Total	**0.0758**	**0.8723**	**0.5340**	**9.9000e-004**	**0.1958**	**0.0381**	**0.2339**	**0.0637**	**0.0351**	**0.0988**	**0.0000**	**89.1221**	**89.1221**	**0.0282**	**0.0000**	**89.8270**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5900e-003	1.1600e-003	0.0121	3.0000e-005	3.5200e-003	2.0000e-005	3.5400e-003	9.3000e-004	2.0000e-005	9.5000e-004	0.0000	3.0388	3.0388	8.0000e-005	0.0000	3.0408

Total	**1.5900e-003**	**1.1600e-003**	**0.0121**	**3.0000e-005**	**3.5200e-003**	**2.0000e-005**	**3.5400e-003**	**9.3000e-004**	**2.0000e-005**	**9.5000e-004**	**0.0000**	**3.0388**	**3.0388**	**8.0000e-005**	**0.0000**	**3.0408**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1958	0.0000	0.1958	0.0637	0.0000	0.0637	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0758	0.8723	0.5340	9.9000e-004		0.0381	0.0381		0.0351	0.0351	0.0000	89.1220	89.1220	0.0282	0.0000	89.8269
Total	**0.0758**	**0.8723**	**0.5340**	**9.9000e-004**	**0.1958**	**0.0381**	**0.2339**	**0.0637**	**0.0351**	**0.0988**	**0.0000**	**89.1220**	**89.1220**	**0.0282**	**0.0000**	**89.8269**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5900e-003	1.1600e-003	0.0121	3.0000e-005	3.5200e-003	2.0000e-005	3.5400e-003	9.3000e-004	2.0000e-005	9.5000e-004	0.0000	3.0388	3.0388	8.0000e-005	0.0000	3.0408
Total	**1.5900e-003**	**1.1600e-003**	**0.0121**	**3.0000e-005**	**3.5200e-003**	**2.0000e-005**	**3.5400e-003**	**9.3000e-004**	**2.0000e-005**	**9.5000e-004**	**0.0000**	**3.0388**	**3.0388**	**8.0000e-005**	**0.0000**	**3.0408**

3.4 Grading - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2289	0.0000	0.2289	0.0819	0.0000	0.0819	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0957	1.0793	0.6871	1.3300e-003		0.0467	0.0467		0.0430	0.0430	0.0000	117.1412	117.1412	0.0379	0.0000	118.0884
Total	**0.0957**	**1.0793**	**0.6871**	**1.3300e-003**	**0.2289**	**0.0467**	**0.2756**	**0.0819**	**0.0430**	**0.1249**	**0.0000**	**117.1412**	**117.1412**	**0.0379**	**0.0000**	**118.0884**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.9800e-003	1.3800e-003	0.0148	4.0000e-005	4.7300e-003	3.0000e-005	4.7600e-003	1.2600e-003	3.0000e-005	1.2800e-003	0.0000	3.9543	3.9543	1.0000e-004	0.0000	3.9567
Total	**1.9800e-003**	**1.3800e-003**	**0.0148**	**4.0000e-005**	**4.7300e-003**	**3.0000e-005**	**4.7600e-003**	**1.2600e-003**	**3.0000e-005**	**1.2800e-003**	**0.0000**	**3.9543**	**3.9543**	**1.0000e-004**	**0.0000**	**3.9567**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Fugitive Dust					0.2289	0.0000	0.2289	0.0819	0.0000	0.0819	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0957	1.0793	0.6871	1.3300e-003		0.0467	0.0467		0.0430	0.0430	0.0000	117.1411	117.1411	0.0379	0.0000	118.0882
Total	**0.0957**	**1.0793**	**0.6871**	**1.3300e-003**	**0.2289**	**0.0467**	**0.2756**	**0.0819**	**0.0430**	**0.1249**	**0.0000**	**117.1411**	**117.1411**	**0.0379**	**0.0000**	**118.0882**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.9800e-003	1.3800e-003	0.0148	4.0000e-005	4.7300e-003	3.0000e-005	4.7600e-003	1.2600e-003	3.0000e-005	1.2800e-003	0.0000	3.9543	3.9543	1.0000e-004	0.0000	3.9567
Total	**1.9800e-003**	**1.3800e-003**	**0.0148**	**4.0000e-005**	**4.7300e-003**	**3.0000e-005**	**4.7600e-003**	**1.2600e-003**	**3.0000e-005**	**1.2800e-003**	**0.0000**	**3.9543**	**3.9543**	**1.0000e-004**	**0.0000**	**3.9567**

3.5 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2321	2.1009	1.8449	2.9500e-003		0.1223	0.1223		0.1150	0.1150	0.0000	253.6129	253.6129	0.0619	0.0000	255.1598
Total	**0.2321**	**2.1009**	**1.8449**	**2.9500e-003**		**0.1223**	**0.1223**		**0.1150**	**0.1150**	**0.0000**	**253.6129**	**253.6129**	**0.0619**	**0.0000**	**255.1598**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0523	1.9134	0.3743	4.7300e-003	0.1162	0.0108	0.1270	0.0335	0.0104	0.0439	0.0000	452.3350	452.3350	0.0362	0.0000	453.2389
Worker	0.5697	0.3992	4.2622	0.0126	1.3624	8.3900e-003	1.3708	0.3618	7.7300e-003	0.3695	0.0000	1,139.8716	1,139.8716	0.0285	0.0000	1,140.5852
Total	**0.6220**	**2.3126**	**4.6365**	**0.0173**	**1.4786**	**0.0192**	**1.4978**	**0.3953**	**0.0181**	**0.4134**	**0.0000**	**1,592.2066**	**1,592.2066**	**0.0647**	**0.0000**	**1,593.8241**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2321	2.1009	1.8449	2.9500e-003		0.1223	0.1223		0.1150	0.1150	0.0000	253.6126	253.6126	0.0619	0.0000	255.1594
Total	**0.2321**	**2.1009**	**1.8449**	**2.9500e-003**		**0.1223**	**0.1223**		**0.1150**	**0.1150**	**0.0000**	**253.6126**	**253.6126**	**0.0619**	**0.0000**	**255.1594**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0523	1.9134	0.3743	4.7300e-003	0.1162	0.0108	0.1270	0.0335	0.0104	0.0439	0.0000	452.3350	452.3350	0.0362	0.0000	453.2389
Worker	0.5697	0.3992	4.2622	0.0126	1.3624	8.3900e-003	1.3708	0.3618	7.7300e-003	0.3695	0.0000	1,139.8716	1,139.8716	0.0285	0.0000	1,140.5852
Total	**0.6220**	**2.3126**	**4.6365**	**0.0173**	**1.4786**	**0.0192**	**1.4978**	**0.3953**	**0.0181**	**0.4134**	**0.0000**	**1,592.2066**	**1,592.2066**	**0.0647**	**0.0000**	**1,593.8241**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2481	2.2749	2.1631	3.5100e-003		0.1251	0.1251		0.1176	0.1176	0.0000	302.2867	302.2867	0.0729	0.0000	304.1099
Total	**0.2481**	**2.2749**	**2.1631**	**3.5100e-003**		**0.1251**	**0.1251**		**0.1176**	**0.1176**	**0.0000**	**302.2867**	**302.2867**	**0.0729**	**0.0000**	**304.1099**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Vendor	0.0523	2.0443	0.3933	5.5900e-003	0.1385	3.9100e-003	0.1424	0.0400	3.7400e-003	0.0437	0.0000	534.8868	534.8868	0.0408	0.0000	535.9069
Worker	0.6334	0.4268	4.6505	0.0145	1.6237	9.7300e-003	1.6334	0.4312	8.9600e-003	0.4401	0.0000	1,313.0572	1,313.0572	0.0306	0.0000	1,313.8218
Total	**0.6857**	**2.4711**	**5.0438**	**0.0201**	**1.7622**	**0.0136**	**1.7758**	**0.4711**	**0.0127**	**0.4838**	**0.0000**	**1,847.9440**	**1,847.9440**	**0.0714**	**0.0000**	**1,849.7288**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2481	2.2749	2.1631	3.5100e-003		0.1251	0.1251		0.1176	0.1176	0.0000	302.2863	302.2863	0.0729	0.0000	304.1095
Total	**0.2481**	**2.2749**	**2.1631**	**3.5100e-003**		**0.1251**	**0.1251**		**0.1176**	**0.1176**	**0.0000**	**302.2863**	**302.2863**	**0.0729**	**0.0000**	**304.1095**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0523	2.0443	0.3933	5.5900e-003	0.1385	3.9100e-003	0.1424	0.0400	3.7400e-003	0.0437	0.0000	534.8868	534.8868	0.0408	0.0000	535.9069
Worker	0.6334	0.4268	4.6505	0.0145	1.6237	9.7300e-003	1.6334	0.4312	8.9600e-003	0.4401	0.0000	1,313.0572	1,313.0572	0.0306	0.0000	1,313.8218
Total	**0.6857**	**2.4711**	**5.0438**	**0.0201**	**1.7622**	**0.0136**	**1.7758**	**0.4711**	**0.0127**	**0.4838**	**0.0000**	**1,847.9440**	**1,847.9440**	**0.0714**	**0.0000**	**1,849.7288**

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2218	2.0300	2.1272	3.5000e-003		0.1052	0.1052		0.0990	0.0990	0.0000	301.2428	301.2428	0.0722	0.0000	303.0471
Total	**0.2218**	**2.0300**	**2.1272**	**3.5000e-003**		**0.1052**	**0.1052**		**0.0990**	**0.0990**	**0.0000**	**301.2428**	**301.2428**	**0.0722**	**0.0000**	**303.0471**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0486	1.9185	0.3649	5.5200e-003	0.1379	3.2800e-003	0.1412	0.0398	3.1300e-003	0.0429	0.0000	528.2540	528.2540	0.0385	0.0000	529.2168
Worker	0.5912	0.3825	4.2676	0.0139	1.6175	9.4400e-003	1.6269	0.4295	8.6900e-003	0.4382	0.0000	1,260.2946	1,260.2946	0.0274	0.0000	1,260.9792
Total	**0.6398**	**2.3011**	**4.6326**	**0.0195**	**1.7554**	**0.0127**	**1.7681**	**0.4693**	**0.0118**	**0.4811**	**0.0000**	**1,788.5486**	**1,788.5486**	**0.0659**	**0.0000**	**1,790.1960**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2218	2.0300	2.1272	3.5000e-003		0.1052	0.1052		0.0990	0.0990	0.0000	301.2425	301.2425	0.0722	0.0000	303.0467
Total	**0.2218**	**2.0300**	**2.1272**	**3.5000e-003**		**0.1052**	**0.1052**		**0.0990**	**0.0990**	**0.0000**	**301.2425**	**301.2425**	**0.0722**	**0.0000**	**303.0467**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0486	1.9185	0.3649	5.5200e-003	0.1379	3.2800e-003	0.1412	0.0398	3.1300e-003	0.0429	0.0000	528.2540	528.2540	0.0385	0.0000	529.2168
Worker	0.5912	0.3825	4.2676	0.0139	1.6175	9.4400e-003	1.6269	0.4295	8.6900e-003	0.4382	0.0000	1,260.2946	1,260.2946	0.0274	0.0000	1,260.9792
Total	**0.6398**	**2.3011**	**4.6326**	**0.0195**	**1.7554**	**0.0127**	**1.7681**	**0.4693**	**0.0118**	**0.4811**	**0.0000**	**1,788.5486**	**1,788.5486**	**0.0659**	**0.0000**	**1,790.1960**

3.6 Paving - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.6 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0284	0.2803	0.4011	6.3000e-004		0.0140	0.0140		0.0129	0.0129	0.0000	55.0739	55.0739	0.0178	0.0000	55.5192
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0284**	**0.2803**	**0.4011**	**6.3000e-004**		**0.0140**	**0.0140**		**0.0129**	**0.0129**	**0.0000**	**55.0739**	**55.0739**	**0.0178**	**0.0000**	**55.5192**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5600e-003	9.7000e-004	0.0110	4.0000e-005	4.5300e-003	3.0000e-005	4.5600e-003	1.2000e-003	2.0000e-005	1.2300e-003	0.0000	3.3986	3.3986	7.0000e-005	0.0000	3.4003
Total	**1.5600e-003**	**9.7000e-004**	**0.0110**	**4.0000e-005**	**4.5300e-003**	**3.0000e-005**	**4.5600e-003**	**1.2000e-003**	**2.0000e-005**	**1.2300e-003**	**0.0000**	**3.3986**	**3.3986**	**7.0000e-005**	**0.0000**	**3.4003**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0284	0.2803	0.4011	6.3000e-004		0.0140	0.0140		0.0129	0.0129	0.0000	55.0738	55.0738	0.0178	0.0000	55.5191
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0284**	**0.2803**	**0.4011**	**6.3000e-004**		**0.0140**	**0.0140**		**0.0129**	**0.0129**	**0.0000**	**55.0738**	**55.0738**	**0.0178**	**0.0000**	**55.5191**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Worker	1.5600e-003	9.7000e-004	0.0110	4.0000e-005	4.5300e-003	3.0000e-005	4.5600e-003	1.2000e-003	2.0000e-005	1.2300e-003	0.0000	3.3986	3.3986	7.0000e-005	0.0000	3.4003
Total	**1.5600e-003**	**9.7000e-004**	**0.0110**	**4.0000e-005**	**4.5300e-003**	**3.0000e-005**	**4.5600e-003**	**1.2000e-003**	**2.0000e-005**	**1.2300e-003**	**0.0000**	**3.3986**	**3.3986**	**7.0000e-005**	**0.0000**	**3.4003**

3.7 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	4.9182					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.2700e-003	0.0358	0.0498	8.0000e-005		1.9500e-003	1.9500e-003		1.9500e-003	1.9500e-003	0.0000	7.0215	7.0215	4.2000e-004	0.0000	7.0320
Total	**4.9235**	**0.0358**	**0.0498**	**8.0000e-005**		**1.9500e-003**	**1.9500e-003**		**1.9500e-003**	**1.9500e-003**	**0.0000**	**7.0215**	**7.0215**	**4.2000e-004**	**0.0000**	**7.0320**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0235	0.0146	0.1661	5.7000e-004	0.0683	3.9000e-004	0.0687	0.0181	3.6000e-004	0.0185	0.0000	51.2059	51.2059	1.0400e-003	0.0000	51.2318
Total	**0.0235**	**0.0146**	**0.1661**	**5.7000e-004**	**0.0683**	**3.9000e-004**	**0.0687**	**0.0181**	**3.6000e-004**	**0.0185**	**0.0000**	**51.2059**	**51.2059**	**1.0400e-003**	**0.0000**	**51.2318**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	4.9182					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.2700e-003	0.0358	0.0498	8.0000e-005		1.9500e-003	1.9500e-003		1.9500e-003	1.9500e-003	0.0000	7.0214	7.0214	4.2000e-004	0.0000	7.0319
Total	**4.9235**	**0.0358**	**0.0498**	**8.0000e-005**		**1.9500e-003**	**1.9500e-003**		**1.9500e-003**	**1.9500e-003**	**0.0000**	**7.0214**	**7.0214**	**4.2000e-004**	**0.0000**	**7.0319**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0235	0.0146	0.1661	5.7000e-004	0.0683	3.9000e-004	0.0687	0.0181	3.6000e-004	0.0185	0.0000	51.2059	51.2059	1.0400e-003	0.0000	51.2318
Total	**0.0235**	**0.0146**	**0.1661**	**5.7000e-004**	**0.0683**	**3.9000e-004**	**0.0687**	**0.0181**	**3.6000e-004**	**0.0185**	**0.0000**	**51.2059**	**51.2059**	**1.0400e-003**	**0.0000**	**51.2318**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	90.0111	825.3176	1,139.2682	7.4001	739.1551	2.9986	742.1536	197.8315	2.7959	200.6273	0.0000	690,671.8108	690,671.8108	25.0107	0.0000	691,297.0783
Unmitigated	90.0111	825.3176	1,139.2682	7.4001	739.1551	2.9986	742.1536	197.8315	2.7959	200.6273	0.0000	690,671.8108	690,671.8108	25.0107	0.0000	691,297.0783

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	580,623.61	557,922.53	511647.27	1,939,325,411	1,939,325,411
Total	580,623.61	557,922.53	511,647.27	1,939,325,411	1,939,325,411

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Mid Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Mid Rise	0.565475	0.033834	0.192058	0.100675	0.009211	0.004032	0.016699	0.069908	0.001423	0.001062	0.004327	0.000756	0.000539

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	2,287.8421	2,287.8421	0.0945	0.0195	2,296.0269
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	2,287.8421	2,287.8421	0.0945	0.0195	2,296.0269
NaturalGas Mitigated	0.1254	1.0716	0.4560	6.8400e-003		0.0866	0.0866		0.0866	0.0866	0.0000	1,241.0444	1,241.0444	0.0238	0.0228	1,248.4193
NaturalGas Unmitigated	0.1254	1.0716	0.4560	6.8400e-003		0.0866	0.0866		0.0866	0.0866	0.0000	1,241.0444	1,241.0444	0.0238	0.0228	1,248.4193

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Mid Rise	2.32563e+007	0.1254	1.0716	0.4560	6.8400e-003		0.0866	0.0866		0.0866	0.0866	0.0000	1,241.0444	1,241.0444	0.0238	0.0228	1,248.4193
Total		**0.1254**	**1.0716**	**0.4560**	**6.8400e-003**		**0.0866**	**0.0866**		**0.0866**	**0.0866**	**0.0000**	**1,241.0444**	**1,241.0444**	**0.0238**	**0.0228**	**1,248.4193**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Mid Rise	2.32563e+007	0.1254	1.0716	0.4560	6.8400e-003		0.0866	0.0866		0.0866	0.0866	0.0000	1,241.0444	1,241.0444	0.0238	0.0228	1,248.4193
Total		**0.1254**	**1.0716**	**0.4560**	**6.8400e-003**		**0.0866**	**0.0866**		**0.0866**	**0.0866**	**0.0000**	**1,241.0444**	**1,241.0444**	**0.0238**	**0.0228**	**1,248.4193**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	7.18044e+006	2,287.8421	0.0945	0.0195	2,296.0269
Total		**2,287.8421**	**0.0945**	**0.0195**	**2,296.0269**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	7.18044e+006	2,287.8421	0.0945	0.0195	2,296.0269
Total		**2,287.8421**	**0.0945**	**0.0195**	**2,296.0269**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	11.8043	0.5941	26.1476	0.0264		1.5909	1.5909		1.5909	1.5909	166.9764	347.3524	514.3288	0.5232	0.0113	530.7852
Unmitigated	11.8043	0.5941	26.1476	0.0264		1.5909	1.5909		1.5909	1.5909	166.9764	347.3524	514.3288	0.5232	0.0113	530.7852

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.4918					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	5.6804					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	5.1490	0.4077	9.9930	0.0255		1.5010	1.5010		1.5010	1.5010	166.9764	320.8712	487.8476	0.4980	0.0113	503.6738
Landscaping	0.4830	0.1864	16.1545	8.6000e-004		0.0899	0.0899		0.0899	0.0899	0.0000	26.4812	26.4812	0.0252	0.0000	27.1114

Total	**11.8043**	**0.5941**	**26.1476**	**0.0264**		**1.5909**	**1.5909**		**1.5909**	**1.5909**	**166.9764**	**347.3524**	**514.3288**	**0.5232**	**0.0113**	**530.7852**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.4918					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	5.6804					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	5.1490	0.4077	9.9930	0.0255		1.5010	1.5010		1.5010	1.5010	166.9764	320.8712	487.8476	0.4980	0.0113	503.6738
Landscaping	0.4830	0.1864	16.1545	8.6000e-004		0.0899	0.0899		0.0899	0.0899	0.0000	26.4812	26.4812	0.0252	0.0000	27.1114
Total	**11.8043**	**0.5941**	**26.1476**	**0.0264**		**1.5909**	**1.5909**		**1.5909**	**1.5909**	**166.9764**	**347.3524**	**514.3288**	**0.5232**	**0.0113**	**530.7852**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	685.9916	3.3644	0.0844	795.2487
Unmitigated	685.9916	3.3644	0.0844	795.2487

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	102.422 / 64.5705	685.9916	3.3644	0.0844	795.2487
Total		**685.9916**	**3.3644**	**0.0844**	**795.2487**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	102.422 / 64.5705	685.9916	3.3644	0.0844	795.2487
Total		**685.9916**	**3.3644**	**0.0844**	**795.2487**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	146.7868	8.6749	0.0000	363.6582
Unmitigated	146.7868	8.6749	0.0000	363.6582

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	723.12	146.7868	8.6749	0.0000	363.6582
Total		**146.7868**	**8.6749**	**0.0000**	**363.6582**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e

Land Use	tons	MT/yr			
Apartments Mid Rise	723.12	146.7868	8.6749	0.0000	363.6582
Total		**146.7868**	**8.6749**	**0.0000**	**363.6582**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

City of Murrieta General Plan Update - Existing VMT

Riverside-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments Mid Rise	1,572.00	Dwelling Unit	41.37	1,572,000.00	4496

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2035
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Vehicle Trips - Adjusted trip rate to meet annual VMT provided by VRPA

Table Name	Column Name	Default Value	New Value
tblVehicleTrips	ST_TR	6.39	354.91
tblVehicleTrips	SU_TR	5.86	325.48
tblVehicleTrips	WD_TR	6.65	369.35

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	4.8490	54.5878	34.2653	0.0643	18.2675	2.3916	20.6591	9.9840	2.2003	12.1843	0.0000	6,367.5239	6,367.5239	1.9490	0.0000	6,416.2491
2020	8.3486	50.2577	65.6548	0.1960	13.7289	2.1753	15.0209	3.6654	2.0012	5.6570	0.0000	19,649.6807	19,649.6807	1.9481	0.0000	19,681.9185
2021	7.6599	36.0361	61.2003	0.1914	13.7289	1.0628	14.7916	3.6654	0.9982	4.6636	0.0000	19,196.9614	19,196.9614	1.2318	0.0000	19,227.7569
2022	7.0919	33.0348	57.5457	0.1866	13.7288	0.9065	14.6353	3.6654	0.8518	4.5171	0.0000	18,718.4537	18,718.4537	1.1811	0.0000	18,747.9819
2023	179.9749	10.2245	15.0563	0.0254	2.5262	0.5111	2.6111	0.6700	0.4703	0.7538	0.0000	2,511.7544	2,511.7544	0.7171	0.0000	2,513.3319
Maximum	**179.9749**	**54.5878**	**65.6548**	**0.1960**	**18.2675**	**2.3916**	**20.6591**	**9.9840**	**2.2003**	**12.1843**	**0.0000**	**19,649.6807**	**19,649.6807**	**1.9490**	**0.0000**	**19,681.9185**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	4.8490	54.5878	34.2653	0.0643	18.2675	2.3916	20.6591	9.9840	2.2003	12.1843	0.0000	6,367.5239	6,367.5239	1.9490	0.0000	6,416.2491
2020	8.3486	50.2577	65.6548	0.1960	13.7289	2.1753	15.0209	3.6654	2.0012	5.6570	0.0000	19,649.6807	19,649.6807	1.9481	0.0000	19,681.9185
2021	7.6599	36.0361	61.2003	0.1914	13.7289	1.0628	14.7916	3.6654	0.9982	4.6636	0.0000	19,196.9614	19,196.9614	1.2318	0.0000	19,227.7569
2022	7.0919	33.0348	57.5457	0.1866	13.7288	0.9065	14.6353	3.6654	0.8518	4.5171	0.0000	18,718.4537	18,718.4537	1.1811	0.0000	18,747.9819
2023	179.9749	10.2245	15.0563	0.0254	2.5262	0.5111	2.6111	0.6700	0.4703	0.7538	0.0000	2,511.7544	2,511.7544	0.7171	0.0000	2,513.3319
Maximum	**179.9749**	**54.5878**	**65.6548**	**0.1960**	**18.2675**	**2.3916**	**20.6591**	**9.9840**	**2.2003**	**12.1843**	**0.0000**	**19,649.6807**	**19,649.6807**	**1.9490**	**0.0000**	**19,681.9185**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	449.6052	34.1074	928.6796	2.0463		120.8017	120.8017		120.8017	120.8017	14,724.7957	28,529.5242	43,254.3199	44.1345	0.9994	44,655.5077
Energy	0.6871	5.8719	2.4987	0.0375		0.4748	0.4748		0.4748	0.4748		7,495.9851	7,495.9851	0.1437	0.1374	7,540.5300
Mobile	594.3480	4,620.4225	7,189.4395	43.8958	4,224.1174	16.8461	4,240.9635	1,129.0321	15.7067	1,144.7388		4,510,382.1963	4,510,382.1963	153.8749		4,514,229.0693
Total	**1,044.6403**	**4,660.4017**	**8,120.6178**	**45.9796**	**4,224.1174**	**138.1225**	**4,362.2399**	**1,129.0321**	**136.9831**	**1,266.0152**	**14,724.7957**	**4,546,407.7057**	**4,561,132.5014**	**198.1531**	**1.1368**	**4,566,425.1070**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	449.6052	34.1074	928.6796	2.0463		120.8017	120.8017		120.8017	120.8017	14,724.7957	28,529.5242	43,254.3199	44.1345	0.9994	44,655.5077
Energy	0.6871	5.8719	2.4987	0.0375		0.4748	0.4748		0.4748	0.4748		7,495.9851	7,495.9851	0.1437	0.1374	7,540.5300
Mobile	594.3480	4,620.4225	7,189.4395	43.8958	4,224.1174	16.8461	4,240.9635	1,129.0321	15.7067	1,144.7388		4,510,382.1963	4,510,382.1963	153.8749		4,514,229.0693
Total	**1,044.6403**	**4,660.4017**	**8,120.6178**	**45.9796**	**4,224.1174**	**138.1225**	**4,362.2399**	**1,129.0321**	**136.9831**	**1,266.0152**	**14,724.7957**	**4,546,407.7057**	**4,561,132.5014**	**198.1531**	**1.1368**	**4,566,425.1070**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	7/29/2019	10/4/2019	5	50	
2	Site Preparation	Site Preparation	10/5/2019	11/15/2019	5	30	
3	Grading	Grading	11/16/2019	2/28/2020	5	75	
4	Building Construction	Building Construction	2/29/2020	12/30/2022	5	740	
5	Paving	Paving	12/31/2022	3/17/2023	5	55	
6	Architectural Coating	Architectural Coating	3/18/2023	6/2/2023	5	55	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 187.5

Acres of Paving: 0

Residential Indoor: 3,183,300; Residential Outdoor: 1,061,100; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38

Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	1,132.00	168.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	226.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.5134	35.7830	22.0600	0.0388		1.7949	1.7949		1.6697	1.6697		3,816.8994	3,816.8994	1.0618		3,843.4451
Total	**3.5134**	**35.7830**	**22.0600**	**0.0388**		**1.7949**	**1.7949**		**1.6697**	**1.6697**		**3,816.8994**	**3,816.8994**	**1.0618**		**3,843.4451**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0826	0.0507	0.6664	1.7100e-003	0.1677	1.0300e-003	0.1687	0.0445	9.5000e-004	0.0454		170.6284	170.6284	4.7800e-003		170.7478
Total	**0.0826**	**0.0507**	**0.6664**	**1.7100e-003**	**0.1677**	**1.0300e-003**	**0.1687**	**0.0445**	**9.5000e-004**	**0.0454**		**170.6284**	**170.6284**	**4.7800e-003**		**170.7478**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.5134	35.7830	22.0600	0.0388		1.7949	1.7949		1.6697	1.6697	0.0000	3,816.8994	3,816.8994	1.0618		3,843.4451
Total	**3.5134**	**35.7830**	**22.0600**	**0.0388**		**1.7949**	**1.7949**		**1.6697**	**1.6697**	**0.0000**	**3,816.8994**	**3,816.8994**	**1.0618**		**3,843.4451**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0826	0.0507	0.6664	1.7100e-003	0.1677	1.0300e-003	0.1687	0.0445	9.5000e-004	0.0454		170.6284	170.6284	4.7800e-003		170.7478
Total	**0.0826**	**0.0507**	**0.6664**	**1.7100e-003**	**0.1677**	**1.0300e-003**	**0.1687**	**0.0445**	**9.5000e-004**	**0.0454**		**170.6284**	**170.6284**	**4.7800e-003**		**170.7478**

3.3 Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.3350	45.5727	22.0630	0.0380		2.3904	2.3904		2.1991	2.1991		3,766.4529	3,766.4529	1.1917		3,796.2445
Total	**4.3350**	**45.5727**	**22.0630**	**0.0380**	**18.0663**	**2.3904**	**20.4566**	**9.9307**	**2.1991**	**12.1298**		**3,766.4529**	**3,766.4529**	**1.1917**		**3,796.2445**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0991	0.0608	0.7997	2.0600e-003	0.2012	1.2400e-003	0.2024	0.0534	1.1400e-003	0.0545		204.7540	204.7540	5.7300e-003		204.8973
Total	**0.0991**	**0.0608**	**0.7997**	**2.0600e-003**	**0.2012**	**1.2400e-003**	**0.2024**	**0.0534**	**1.1400e-003**	**0.0545**		**204.7540**	**204.7540**	**5.7300e-003**		**204.8973**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.3350	45.5727	22.0630	0.0380		2.3904	2.3904		2.1991	2.1991	0.0000	3,766.4529	3,766.4529	1.1917		3,796.2445
Total	**4.3350**	**45.5727**	**22.0630**	**0.0380**	**18.0663**	**2.3904**	**20.4566**	**9.9307**	**2.1991**	**12.1298**	**0.0000**	**3,766.4529**	**3,766.4529**	**1.1917**		**3,796.2445**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0991	0.0608	0.7997	2.0600e-003	0.2012	1.2400e-003	0.2024	0.0534	1.1400e-003	0.0545		204.7540	204.7540	5.7300e-003		204.8973
Total	**0.0991**	**0.0608**	**0.7997**	**2.0600e-003**	**0.2012**	**1.2400e-003**	**0.2024**	**0.0534**	**1.1400e-003**	**0.0545**		**204.7540**	**204.7540**	**5.7300e-003**		**204.8973**

3.4 Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	4.7389	54.5202	33.3768	0.0620		2.3827	2.3827		2.1920	2.1920		6,140.0195	6,140.0195	1.9426		6,188.5854
Total	**4.7389**	**54.5202**	**33.3768**	**0.0620**	**8.6733**	**2.3827**	**11.0560**	**3.5965**	**2.1920**	**5.7885**		**6,140.0195**	**6,140.0195**	**1.9426**		**6,188.5854**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1101	0.0676	0.8885	2.2900e-003	0.2236	1.3800e-003	0.2249	0.0593	1.2700e-003	0.0606		227.5045	227.5045	6.3700e-003		227.6637
Total	**0.1101**	**0.0676**	**0.8885**	**2.2900e-003**	**0.2236**	**1.3800e-003**	**0.2249**	**0.0593**	**1.2700e-003**	**0.0606**		**227.5045**	**227.5045**	**6.3700e-003**		**227.6637**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	4.7389	54.5202	33.3768	0.0620		2.3827	2.3827		2.1920	2.1920	0.0000	6,140.0195	6,140.0195	1.9426		6,188.5854
Total	**4.7389**	**54.5202**	**33.3768**	**0.0620**	**8.6733**	**2.3827**	**11.0560**	**3.5965**	**2.1920**	**5.7885**	**0.0000**	**6,140.0195**	**6,140.0195**	**1.9426**		**6,188.5854**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1101	0.0676	0.8885	2.2900e-003	0.2236	1.3800e-003	0.2249	0.0593	1.2700e-003	0.0606		227.5045	227.5045	6.3700e-003		227.6637
Total	**0.1101**	**0.0676**	**0.8885**	**2.2900e-003**	**0.2236**	**1.3800e-003**	**0.2249**	**0.0593**	**1.2700e-003**	**0.0606**		**227.5045**	**227.5045**	**6.3700e-003**		**227.6637**

3.4 Grading - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	4.4501	50.1975	31.9583	0.0620		2.1739	2.1739		2.0000	2.0000		6,005.8653	6,005.8653	1.9424		6,054.4257
Total	**4.4501**	**50.1975**	**31.9583**	**0.0620**	**8.6733**	**2.1739**	**10.8472**	**3.5965**	**2.0000**	**5.5965**		**6,005.8653**	**6,005.8653**	**1.9424**		**6,054.4257**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1018	0.0602	0.8064	2.2100e-003	0.2236	1.3500e-003	0.2249	0.0593	1.2500e-003	0.0605		220.3189	220.3189	5.6500e-003		220.4601
Total	**0.1018**	**0.0602**	**0.8064**	**2.2100e-003**	**0.2236**	**1.3500e-003**	**0.2249**	**0.0593**	**1.2500e-003**	**0.0605**		**220.3189**	**220.3189**	**5.6500e-003**		**220.4601**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	4.4501	50.1975	31.9583	0.0620		2.1739	2.1739		2.0000	2.0000	0.0000	6,005.8653	6,005.8653	1.9424		6,054.4257
Total	**4.4501**	**50.1975**	**31.9583**	**0.0620**	**8.6733**	**2.1739**	**10.8472**	**3.5965**	**2.0000**	**5.5965**	**0.0000**	**6,005.8653**	**6,005.8653**	**1.9424**		**6,054.4257**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1018	0.0602	0.8064	2.2100e-003	0.2236	1.3500e-003	0.2249	0.0593	1.2500e-003	0.0605		220.3189	220.3189	5.6500e-003		220.4601
Total	**0.1018**	**0.0602**	**0.8064**	**2.2100e-003**	**0.2236**	**1.3500e-003**	**0.2249**	**0.0593**	**1.2500e-003**	**0.0605**		**220.3189**	**220.3189**	**5.6500e-003**		**220.4601**

3.5 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.1198	19.1860	16.8485	0.0269		1.1171	1.1171		1.0503	1.0503		2,553.0631	2,553.0631	0.6229		2,568.6345
Total	**2.1198**	**19.1860**	**16.8485**	**0.0269**		**1.1171**	**1.1171**		**1.0503**	**1.0503**		**2,553.0631**	**2,553.0631**	**0.6229**		**2,568.6345**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4683	17.2858	3.1623	0.0439	1.0758	0.0983	1.1741	0.3098	0.0941	0.4038		4,626.5675	4,626.5675	0.3470		4,635.2429
Worker	5.7605	3.4068	45.6439	0.1252	12.6531	0.0766	12.7297	3.3557	0.0706	3.4262		12,470.0502	12,470.0502	0.3196		12,478.0411
Total	**6.2288**	**20.6926**	**48.8063**	**0.1691**	**13.7289**	**0.1749**	**13.9038**	**3.6654**	**0.1646**	**3.8300**		**17,096.6177**	**17,096.6177**	**0.6667**		**17,113.2840**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.1198	19.1860	16.8485	0.0269		1.1171	1.1171		1.0503	1.0503	0.0000	2,553.0631	2,553.0631	0.6229		2,568.6345
Total	**2.1198**	**19.1860**	**16.8485**	**0.0269**		**1.1171**	**1.1171**		**1.0503**	**1.0503**	**0.0000**	**2,553.0631**	**2,553.0631**	**0.6229**		**2,568.6345**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4683	17.2858	3.1623	0.0439	1.0758	0.0983	1.1741	0.3098	0.0941	0.4038		4,626.5675	4,626.5675	0.3470		4,635.2429
Worker	5.7605	3.4068	45.6439	0.1252	12.6531	0.0766	12.7297	3.3557	0.0706	3.4262		12,470.0502	12,470.0502	0.3196		12,478.0411
Total	**6.2288**	**20.6926**	**48.8063**	**0.1691**	**13.7289**	**0.1749**	**13.9038**	**3.6654**	**0.1646**	**3.8300**		**17,096.6177**	**17,096.6177**	**0.6667**		**17,113.2840**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013		2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**		**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3922	15.5466	2.7738	0.0435	1.0758	0.0296	1.1053	0.3097	0.0283	0.3380		4,590.6172	4,590.6172	0.3284		4,598.8275
Worker	5.3668	3.0574	41.8514	0.1210	12.6531	0.0746	12.7277	3.3557	0.0687	3.4243		12,052.9803	12,052.9803	0.2874		12,060.1652
Total	**5.7590**	**18.6040**	**44.6251**	**0.1645**	**13.7289**	**0.1041**	**13.8330**	**3.6654**	**0.0969**	**3.7623**		**16,643.5975**	**16,643.5975**	**0.6158**		**16,658.9927**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013	0.0000	2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**	**0.0000**	**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3922	15.5466	2.7738	0.0435	1.0758	0.0296	1.1053	0.3097	0.0283	0.3380		4,590.6172	4,590.6172	0.3284		4,598.8275
Worker	5.3668	3.0574	41.8514	0.1210	12.6531	0.0746	12.7277	3.3557	0.0687	3.4243		12,052.9803	12,052.9803	0.2874		12,060.1652
Total	**5.7590**	**18.6040**	**44.6251**	**0.1645**	**13.7289**	**0.1041**	**13.8330**	**3.6654**	**0.0969**	**3.7623**		**16,643.5975**	**16,643.5975**	**0.6158**		**16,658.9927**

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612		2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**		**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3657	14.6677	2.5799	0.0431	1.0757	0.0249	1.1006	0.3097	0.0238	0.3335		4,551.5430	4,551.5430	0.3110		4,559.3188
Worker	5.0199	2.7515	38.6023	0.1165	12.6531	0.0726	12.7257	3.3557	0.0668	3.4225		11,612.5772	11,612.5772	0.2582		11,619.0309
Total	**5.3856**	**17.4192**	**41.1823**	**0.1597**	**13.7288**	**0.0975**	**13.8263**	**3.6654**	**0.0906**	**3.7560**		**16,164.1202**	**16,164.1202**	**0.5692**		**16,178.3497**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612	0.0000	2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**	**0.0000**	**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3657	14.6677	2.5799	0.0431	1.0757	0.0249	1.1006	0.3097	0.0238	0.3335		4,551.5430	4,551.5430	0.3110		4,559.3188
Worker	5.0199	2.7515	38.6023	0.1165	12.6531	0.0726	12.7257	3.3557	0.0668	3.4225		11,612.5772	11,612.5772	0.2582		11,619.0309
Total	**5.3856**	**17.4192**	**41.1823**	**0.1597**	**13.7288**	**0.0975**	**13.8263**	**3.6654**	**0.0906**	**3.7560**		**16,164.1202**	**16,164.1202**	**0.5692**		**16,178.3497**

3.6 Paving - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1028	11.1249	14.5805	0.0228		0.5679	0.5679		0.5225	0.5225		2,207.6603	2,207.6603	0.7140		2,225.5104
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.1028**	**11.1249**	**14.5805**	**0.0228**		**0.5679**	**0.5679**		**0.5225**	**0.5225**		**2,207.6603**	**2,207.6603**	**0.7140**		**2,225.5104**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0665	0.0365	0.5115	1.5400e-003	0.1677	9.6000e-004	0.1686	0.0445	8.9000e-004	0.0454		153.8769	153.8769	3.4200e-003		153.9624
Total	**0.0665**	**0.0365**	**0.5115**	**1.5400e-003**	**0.1677**	**9.6000e-004**	**0.1686**	**0.0445**	**8.9000e-004**	**0.0454**		**153.8769**	**153.8769**	**3.4200e-003**		**153.9624**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1028	11.1249	14.5805	0.0228		0.5679	0.5679		0.5225	0.5225	0.0000	2,207.6603	2,207.6603	0.7140		2,225.5104
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.1028**	**11.1249**	**14.5805**	**0.0228**		**0.5679**	**0.5679**		**0.5225**	**0.5225**	**0.0000**	**2,207.6603**	**2,207.6603**	**0.7140**		**2,225.5104**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0665	0.0365	0.5115	1.5400e-003	0.1677	9.6000e-004	0.1686	0.0445	8.9000e-004	0.0454		153.8769	153.8769	3.4200e-003		153.9624
Total	**0.0665**	**0.0365**	**0.5115**	**1.5400e-003**	**0.1677**	**9.6000e-004**	**0.1686**	**0.0445**	**8.9000e-004**	**0.0454**		**153.8769**	**153.8769**	**3.4200e-003**		**153.9624**

3.6 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0327	10.1917	14.5842	0.0228		0.5102	0.5102		0.4694	0.4694		2,207.5841	2,207.5841	0.7140		2,225.4336
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0327**	**10.1917**	**14.5842**	**0.0228**		**0.5102**	**0.5102**		**0.4694**	**0.4694**		**2,207.5841**	**2,207.5841**	**0.7140**		**2,225.4336**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0624	0.0329	0.4721	1.4900e-003	0.1677	9.4000e-004	0.1686	0.0445	8.6000e-004	0.0453		148.0292	148.0292	3.0700e-003		148.1059
Total	**0.0624**	**0.0329**	**0.4721**	**1.4900e-003**	**0.1677**	**9.4000e-004**	**0.1686**	**0.0445**	**8.6000e-004**	**0.0453**		**148.0292**	**148.0292**	**3.0700e-003**		**148.1059**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0327	10.1917	14.5842	0.0228		0.5102	0.5102		0.4694	0.4694	0.0000	2,207.5841	2,207.5841	0.7140		2,225.4336
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0327**	**10.1917**	**14.5842**	**0.0228**		**0.5102**	**0.5102**		**0.4694**	**0.4694**	**0.0000**	**2,207.5841**	**2,207.5841**	**0.7140**		**2,225.4336**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0624	0.0329	0.4721	1.4900e-003	0.1677	9.4000e-004	0.1686	0.0445	8.6000e-004	0.0453		148.0292	148.0292	3.0700e-003		148.1059
Total	**0.0624**	**0.0329**	**0.4721**	**1.4900e-003**	**0.1677**	**9.4000e-004**	**0.1686**	**0.0445**	**8.6000e-004**	**0.0453**		**148.0292**	**148.0292**	**3.0700e-003**		**148.1059**

3.7 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	178.8436					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708		281.4481	281.4481	0.0168		281.8690
Total	**179.0352**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**		**281.4481**	**281.4481**	**0.0168**		**281.8690**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.9397	0.4954	7.1125	0.0224	2.5262	0.0142	2.5403	0.6700	0.0130	0.6830		2,230.3063	2,230.3063	0.0463		2,231.4628
Total	**0.9397**	**0.4954**	**7.1125**	**0.0224**	**2.5262**	**0.0142**	**2.5403**	**0.6700**	**0.0130**	**0.6830**		**2,230.3063**	**2,230.3063**	**0.0463**		**2,231.4628**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	178.8436					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708	0.0000	281.4481	281.4481	0.0168		281.8690
Total	**179.0352**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**	**0.0000**	**281.4481**	**281.4481**	**0.0168**		**281.8690**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.9397	0.4954	7.1125	0.0224	2.5262	0.0142	2.5403	0.6700	0.0130	0.6830		2,230.3063	2,230.3063	0.0463		2,231.4628
Total	**0.9397**	**0.4954**	**7.1125**	**0.0224**	**2.5262**	**0.0142**	**2.5403**	**0.6700**	**0.0130**	**0.6830**		**2,230.3063**	**2,230.3063**	**0.0463**		**2,231.4628**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	594.3480	4,620.4225	7,189.4395	43.8958	4,224.1174	16.8461	4,240.9635	1,129.0321	15.7067	1,144.7388		4,510,382.1963	4,510,382.1963	153.8749		4,514,229.0693

Unmitigated	594.3480	4,620.4225	7,189.4395	43.8958	4,224.1174	16.8461	4,240.9635	1,129.0321	15.7067	1,144.7388		4,510,382.1963	4,510,382.1963	153.8749		4,514,229.0693

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	580,623.61	557,922.53	511647.27	1,939,325,411	1,939,325,411
Total	580,623.61	557,922.53	511,647.27	1,939,325,411	1,939,325,411

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Mid Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Mid Rise	0.565475	0.033834	0.192058	0.100675	0.009211	0.004032	0.016699	0.069908	0.001423	0.001062	0.004327	0.000756	0.000539

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.6871	5.8719	2.4987	0.0375		0.4748	0.4748		0.4748	0.4748		7,495.9851	7,495.9851	0.1437	0.1374	7,540.5300
NaturalGas Unmitigated	0.6871	5.8719	2.4987	0.0375		0.4748	0.4748		0.4748	0.4748		7,495.9851	7,495.9851	0.1437	0.1374	7,540.5300

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Mid Rise	63715.9	0.6871	5.8719	2.4987	0.0375		0.4748	0.4748		0.4748	0.4748		7,495.9851	7,495.9851	0.1437	0.1374	7,540.5300
Total		**0.6871**	**5.8719**	**2.4987**	**0.0375**		**0.4748**	**0.4748**		**0.4748**	**0.4748**		**7,495.9851**	**7,495.9851**	**0.1437**	**0.1374**	**7,540.5300**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Mid Rise	63.7159	0.6871	5.8719	2.4987	0.0375		0.4748	0.4748		0.4748	0.4748		7,495.9851	7,495.9851	0.1437	0.1374	7,540.5300
Total		**0.6871**	**5.8719**	**2.4987**	**0.0375**		**0.4748**	**0.4748**		**0.4748**	**0.4748**		**7,495.9851**	**7,495.9851**	**0.1437**	**0.1374**	**7,540.5300**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	449.6052	34.1074	928.6796	2.0463		120.8017	120.8017		120.8017	120.8017	14,724.7957	28,529.5242	43,254.3199	44.1345	0.9994	44,655.5077
Unmitigated	449.6052	34.1074	928.6796	2.0463		120.8017	120.8017		120.8017	120.8017	14,724.7957	28,529.5242	43,254.3199	44.1345	0.9994	44,655.5077

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.6949					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	31.1256					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	411.9206	32.6164	799.4435	2.0395		120.0824	120.0824		120.0824	120.0824	14,724.7957	28,296.0000	43,020.7957	43.9122	0.9994	44,416.4259
Landscaping	3.8641	1.4910	129.2361	6.8500e-003		0.7192	0.7192		0.7192	0.7192		233.5242	233.5242	0.2223		239.0818
Total	**449.6052**	**34.1074**	**928.6796**	**2.0463**		**120.8017**	**120.8017**		**120.8017**	**120.8017**	**14,724.7957**	**28,529.5242**	**43,254.3199**	**44.1345**	**0.9994**	**44,655.5077**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.6949					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	31.1256					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	411.9206	32.6164	799.4435	2.0395		120.0824	120.0824		120.0824	120.0824	14,724.7957	28,296.0000	43,020.7957	43.9122	0.9994	44,416.4259
Landscaping	3.8641	1.4910	129.2361	6.8500e-003		0.7192	0.7192		0.7192	0.7192		233.5242	233.5242	0.2223		239.0818
Total	**449.6052**	**34.1074**	**928.6796**	**2.0463**		**120.8017**	**120.8017**		**120.8017**	**120.8017**	**14,724.7957**	**28,529.5242**	**43,254.3199**	**44.1345**	**0.9994**	**44,655.5077**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Proposed VMT Operations CalEEMod Output

City of Murrieta General Plan Update - GP Update Proposed VMT

Riverside-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments Mid Rise	1,572.00	Dwelling Unit	41.37	1,572,000.00	4496

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2035
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Vehicle Trips - Adjusted trip rate to meet annual VMT provided by VRPA

Table Name	Column Name	Default Value	New Value
tblVehicleTrips	ST_TR	6.39	349.00
tblVehicleTrips	SU_TR	5.86	320.06
tblVehicleTrips	WD_TR	6.65	363.21

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.2335	2.4540	1.4531	2.6300e-003	0.4774	0.1189	0.5963	0.2155	0.1099	0.3253	0.0000	236.1047	236.1047	0.0688	0.0000	237.8233
2020	0.9517	5.4941	7.1833	0.0217	1.7122	0.1883	1.9005	0.4785	0.1761	0.6546	0.0000	1,966.9150	1,966.9150	0.1646	0.0000	1,971.0289
2021	0.9337	4.7460	7.2068	0.0236	1.7622	0.1387	1.9009	0.4711	0.1303	0.6014	0.0000	2,150.2307	2,150.2307	0.1443	0.0000	2,153.8386
2022	0.8616	4.3311	6.7598	0.0230	1.7554	0.1179	1.8733	0.4693	0.1108	0.5801	0.0000	2,089.7914	2,089.7914	0.1381	0.0000	2,093.2431
2023	4.9769	0.3316	0.6280	1.3100e-003	0.0728	0.0164	0.0892	0.0193	0.0152	0.0346	0.0000	116.6998	116.6998	0.0193	0.0000	117.1833
Maximum	**4.9769**	**5.4941**	**7.2068**	**0.0236**	**1.7622**	**0.1883**	**1.9009**	**0.4785**	**0.1761**	**0.6546**	**0.0000**	**2,150.2307**	**2,150.2307**	**0.1646**	**0.0000**	**2,153.8386**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.2335	2.4540	1.4531	2.6300e-003	0.4774	0.1189	0.5963	0.2155	0.1099	0.3253	0.0000	236.1044	236.1044	0.0688	0.0000	237.8231
2020	0.9517	5.4941	7.1833	0.0217	1.7122	0.1883	1.9005	0.4785	0.1761	0.6546	0.0000	1,966.9145	1,966.9145	0.1646	0.0000	1,971.0285
2021	0.9337	4.7459	7.2068	0.0236	1.7622	0.1387	1.9009	0.4711	0.1303	0.6014	0.0000	2,150.2303	2,150.2303	0.1443	0.0000	2,153.8383
2022	0.8616	4.3311	6.7598	0.0230	1.7554	0.1179	1.8733	0.4693	0.1108	0.5801	0.0000	2,089.7911	2,089.7911	0.1381	0.0000	2,093.2427

2023	4.9769	0.3316	0.6280	1.3100e-003	0.0728	0.0164	0.0892	0.0193	0.0152	0.0346	0.0000	116.6997	116.6997	0.0193	0.0000	117.1832
Maximum	**4.9769**	**5.4941**	**7.2068**	**0.0236**	**1.7622**	**0.1883**	**1.9009**	**0.4785**	**0.1761**	**0.6546**	**0.0000**	**2,150.2303**	**2,150.2303**	**0.1646**	**0.0000**	**2,153.8383**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	7-29-2019	10-28-2019	1.3867	1.3867
2	10-29-2019	1-28-2020	1.8464	1.8464
3	1-29-2020	4-28-2020	1.6395	1.6395
4	4-29-2020	7-28-2020	1.5674	1.5674
5	7-29-2020	10-28-2020	1.5839	1.5839
6	10-29-2020	1-28-2021	1.5367	1.5367
7	1-29-2021	4-28-2021	1.4022	1.4022
8	4-29-2021	7-28-2021	1.4201	1.4201
9	7-29-2021	10-28-2021	1.4347	1.4347
10	10-29-2021	1-28-2022	1.3965	1.3965
11	1-29-2022	4-28-2022	1.2874	1.2874
12	4-29-2022	7-28-2022	1.3041	1.3041
13	7-29-2022	10-28-2022	1.3174	1.3174
14	10-29-2022	1-28-2023	1.0180	1.0180
15	1-29-2023	4-28-2023	2.9207	2.9207
16	4-29-2023	7-28-2023	2.2722	2.2722
		Highest	2.9207	2.9207

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	11.8043	0.5941	26.1476	0.0264		1.5909	1.5909		1.5909	1.5909	166.9764	347.3524	514.3288	0.5232	0.0113	530.7852
Energy	0.1254	1.0716	0.4560	6.8400e-003		0.0866	0.0866		0.0866	0.0866	0.0000	3,528.8865	3,528.8865	0.1182	0.0423	3,544.4462
Mobile	88.5135	811.5865	1,120.3138	7.2770	726.8575	2.9487	729.8062	194.5401	2.7494	197.2894	0.0000	679,180.8759	679,180.8759	24.5946	0.0000	679,795.7406
Waste						0.0000	0.0000		0.0000	0.0000	146.7868	0.0000	146.7868	8.6749	0.0000	363.6582
Water						0.0000	0.0000		0.0000	0.0000	32.4938	653.4978	685.9916	3.3644	0.0844	795.2487
Total	**100.4432**	**813.2522**	**1,146.9174**	**7.3102**	**726.8575**	**4.6263**	**731.4838**	**194.5401**	**4.4270**	**198.9670**	**346.2570**	**683,710.6126**	**684,056.8696**	**37.2753**	**0.1380**	**685,029.8789**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	11.8043	0.5941	26.1476	0.0264		1.5909	1.5909		1.5909	1.5909	166.9764	347.3524	514.3288	0.5232	0.0113	530.7852
Energy	0.1254	1.0716	0.4560	6.8400e-003		0.0866	0.0866		0.0866	0.0866	0.0000	3,528.8865	3,528.8865	0.1182	0.0423	3,544.4462
Mobile	88.5135	811.5865	1,120.3138	7.2770	726.8575	2.9487	729.8062	194.5401	2.7494	197.2894	0.0000	679,180.8759	679,180.8759	24.5946	0.0000	679,795.7406
Waste						0.0000	0.0000		0.0000	0.0000	146.7868	0.0000	146.7868	8.6749	0.0000	363.6582
Water						0.0000	0.0000		0.0000	0.0000	32.4938	653.4978	685.9916	3.3644	0.0844	795.2487
Total	**100.4432**	**813.2522**	**1,146.9174**	**7.3102**	**726.8575**	**4.6263**	**731.4838**	**194.5401**	**4.4270**	**198.9670**	**346.2570**	**683,710.6126**	**684,056.8696**	**37.2753**	**0.1380**	**685,029.8789**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e

Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	7/29/2019	10/4/2019	5	50	
2	Site Preparation	Site Preparation	10/5/2019	11/15/2019	5	30	
3	Grading	Grading	11/16/2019	2/28/2020	5	75	
4	Building Construction	Building Construction	2/29/2020	12/30/2022	5	740	
5	Paving	Paving	12/31/2022	3/17/2023	5	55	
6	Architectural Coating	Architectural Coating	3/18/2023	6/2/2023	5	55	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 187.5

Acres of Paving: 0

Residential Indoor: 3,183,300; Residential Outdoor: 1,061,100; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48

Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	1,132.00	168.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	226.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Off-Road	0.0878	0.8946	0.5515	9.7000e-004		0.0449	0.0449		0.0417	0.0417	0.0000	86.5658	86.5658	0.0241	0.0000	87.1679
Total	**0.0878**	**0.8946**	**0.5515**	**9.7000e-004**		**0.0449**	**0.0449**		**0.0417**	**0.0417**	**0.0000**	**86.5658**	**86.5658**	**0.0241**	**0.0000**	**87.1679**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.8600e-003	1.3600e-003	0.0142	4.0000e-005	4.1200e-003	3.0000e-005	4.1500e-003	1.0900e-003	2.0000e-005	1.1200e-003	0.0000	3.5610	3.5610	1.0000e-004	0.0000	3.5635
Total	**1.8600e-003**	**1.3600e-003**	**0.0142**	**4.0000e-005**	**4.1200e-003**	**3.0000e-005**	**4.1500e-003**	**1.0900e-003**	**2.0000e-005**	**1.1200e-003**	**0.0000**	**3.5610**	**3.5610**	**1.0000e-004**	**0.0000**	**3.5635**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0878	0.8946	0.5515	9.7000e-004		0.0449	0.0449		0.0417	0.0417	0.0000	86.5657	86.5657	0.0241	0.0000	87.1678
Total	**0.0878**	**0.8946**	**0.5515**	**9.7000e-004**		**0.0449**	**0.0449**		**0.0417**	**0.0417**	**0.0000**	**86.5657**	**86.5657**	**0.0241**	**0.0000**	**87.1678**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.8600e-003	1.3600e-003	0.0142	4.0000e-005	4.1200e-003	3.0000e-005	4.1500e-003	1.0900e-003	2.0000e-005	1.1200e-003	0.0000	3.5610	3.5610	1.0000e-004	0.0000	3.5635
Total	**1.8600e-003**	**1.3600e-003**	**0.0142**	**4.0000e-005**	**4.1200e-003**	**3.0000e-005**	**4.1500e-003**	**1.0900e-003**	**2.0000e-005**	**1.1200e-003**	**0.0000**	**3.5610**	**3.5610**	**1.0000e-004**	**0.0000**	**3.5635**

3.3 Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2710	0.0000	0.2710	0.1490	0.0000	0.1490	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0650	0.6836	0.3310	5.7000e-004		0.0359	0.0359		0.0330	0.0330	0.0000	51.2530	51.2530	0.0162	0.0000	51.6584
Total	**0.0650**	**0.6836**	**0.3310**	**5.7000e-004**	**0.2710**	**0.0359**	**0.3069**	**0.1490**	**0.0330**	**0.1820**	**0.0000**	**51.2530**	**51.2530**	**0.0162**	**0.0000**	**51.6584**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3400e-003	9.8000e-004	0.0102	3.0000e-005	2.9700e-003	2.0000e-005	2.9900e-003	7.9000e-004	2.0000e-005	8.1000e-004	0.0000	2.5639	2.5639	7.0000e-005	0.0000	2.5657
Total	**1.3400e-003**	**9.8000e-004**	**0.0102**	**3.0000e-005**	**2.9700e-003**	**2.0000e-005**	**2.9900e-003**	**7.9000e-004**	**2.0000e-005**	**8.1000e-004**	**0.0000**	**2.5639**	**2.5639**	**7.0000e-005**	**0.0000**	**2.5657**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2710	0.0000	0.2710	0.1490	0.0000	0.1490	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0650	0.6836	0.3309	5.7000e-004		0.0359	0.0359		0.0330	0.0330	0.0000	51.2530	51.2530	0.0162	0.0000	51.6584
Total	**0.0650**	**0.6836**	**0.3309**	**5.7000e-004**	**0.2710**	**0.0359**	**0.3069**	**0.1490**	**0.0330**	**0.1820**	**0.0000**	**51.2530**	**51.2530**	**0.0162**	**0.0000**	**51.6584**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3400e-003	9.8000e-004	0.0102	3.0000e-005	2.9700e-003	2.0000e-005	2.9900e-003	7.9000e-004	2.0000e-005	8.1000e-004	0.0000	2.5639	2.5639	7.0000e-005	0.0000	2.5657
Total	**1.3400e-003**	**9.8000e-004**	**0.0102**	**3.0000e-005**	**2.9700e-003**	**2.0000e-005**	**2.9900e-003**	**7.9000e-004**	**2.0000e-005**	**8.1000e-004**	**0.0000**	**2.5639**	**2.5639**	**7.0000e-005**	**0.0000**	**2.5657**

3.4 Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1958	0.0000	0.1958	0.0637	0.0000	0.0637	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0758	0.8723	0.5340	9.9000e-004		0.0381	0.0381		0.0351	0.0351	0.0000	89.1221	89.1221	0.0282	0.0000	89.8270
Total	**0.0758**	**0.8723**	**0.5340**	**9.9000e-004**	**0.1958**	**0.0381**	**0.2339**	**0.0637**	**0.0351**	**0.0988**	**0.0000**	**89.1221**	**89.1221**	**0.0282**	**0.0000**	**89.8270**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5900e-003	1.1600e-003	0.0121	3.0000e-005	3.5200e-003	2.0000e-005	3.5400e-003	9.3000e-004	2.0000e-005	9.5000e-004	0.0000	3.0388	3.0388	8.0000e-005	0.0000	3.0408

Total	**1.5900e-003**	**1.1600e-003**	**0.0121**	**3.0000e-005**	**3.5200e-003**	**2.0000e-005**	**3.5400e-003**	**9.3000e-004**	**2.0000e-005**	**9.5000e-004**	**0.0000**	**3.0388**	**3.0388**	**8.0000e-005**	**0.0000**	**3.0408**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1958	0.0000	0.1958	0.0637	0.0000	0.0637	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0758	0.8723	0.5340	9.9000e-004		0.0381	0.0381		0.0351	0.0351	0.0000	89.1220	89.1220	0.0282	0.0000	89.8269
Total	**0.0758**	**0.8723**	**0.5340**	**9.9000e-004**	**0.1958**	**0.0381**	**0.2339**	**0.0637**	**0.0351**	**0.0988**	**0.0000**	**89.1220**	**89.1220**	**0.0282**	**0.0000**	**89.8269**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5900e-003	1.1600e-003	0.0121	3.0000e-005	3.5200e-003	2.0000e-005	3.5400e-003	9.3000e-004	2.0000e-005	9.5000e-004	0.0000	3.0388	3.0388	8.0000e-005	0.0000	3.0408
Total	**1.5900e-003**	**1.1600e-003**	**0.0121**	**3.0000e-005**	**3.5200e-003**	**2.0000e-005**	**3.5400e-003**	**9.3000e-004**	**2.0000e-005**	**9.5000e-004**	**0.0000**	**3.0388**	**3.0388**	**8.0000e-005**	**0.0000**	**3.0408**

3.4 Grading - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2289	0.0000	0.2289	0.0819	0.0000	0.0819	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0957	1.0793	0.6871	1.3300e-003		0.0467	0.0467		0.0430	0.0430	0.0000	117.1412	117.1412	0.0379	0.0000	118.0884
Total	**0.0957**	**1.0793**	**0.6871**	**1.3300e-003**	**0.2289**	**0.0467**	**0.2756**	**0.0819**	**0.0430**	**0.1249**	**0.0000**	**117.1412**	**117.1412**	**0.0379**	**0.0000**	**118.0884**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.9800e-003	1.3800e-003	0.0148	4.0000e-005	4.7300e-003	3.0000e-005	4.7600e-003	1.2600e-003	3.0000e-005	1.2800e-003	0.0000	3.9543	3.9543	1.0000e-004	0.0000	3.9567
Total	**1.9800e-003**	**1.3800e-003**	**0.0148**	**4.0000e-005**	**4.7300e-003**	**3.0000e-005**	**4.7600e-003**	**1.2600e-003**	**3.0000e-005**	**1.2800e-003**	**0.0000**	**3.9543**	**3.9543**	**1.0000e-004**	**0.0000**	**3.9567**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Fugitive Dust					0.2289	0.0000	0.2289	0.0819	0.0000	0.0819	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0957	1.0793	0.6871	1.3300e-003		0.0467	0.0467		0.0430	0.0430	0.0000	117.1411	117.1411	0.0379	0.0000	118.0882
Total	**0.0957**	**1.0793**	**0.6871**	**1.3300e-003**	**0.2289**	**0.0467**	**0.2756**	**0.0819**	**0.0430**	**0.1249**	**0.0000**	**117.1411**	**117.1411**	**0.0379**	**0.0000**	**118.0882**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.9800e-003	1.3800e-003	0.0148	4.0000e-005	4.7300e-003	3.0000e-005	4.7600e-003	1.2600e-003	3.0000e-005	1.2800e-003	0.0000	3.9543	3.9543	1.0000e-004	0.0000	3.9567
Total	**1.9800e-003**	**1.3800e-003**	**0.0148**	**4.0000e-005**	**4.7300e-003**	**3.0000e-005**	**4.7600e-003**	**1.2600e-003**	**3.0000e-005**	**1.2800e-003**	**0.0000**	**3.9543**	**3.9543**	**1.0000e-004**	**0.0000**	**3.9567**

3.5 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2321	2.1009	1.8449	2.9500e-003		0.1223	0.1223		0.1150	0.1150	0.0000	253.6129	253.6129	0.0619	0.0000	255.1598
Total	**0.2321**	**2.1009**	**1.8449**	**2.9500e-003**		**0.1223**	**0.1223**		**0.1150**	**0.1150**	**0.0000**	**253.6129**	**253.6129**	**0.0619**	**0.0000**	**255.1598**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0523	1.9134	0.3743	4.7300e-003	0.1162	0.0108	0.1270	0.0335	0.0104	0.0439	0.0000	452.3350	452.3350	0.0362	0.0000	453.2389
Worker	0.5697	0.3992	4.2622	0.0126	1.3624	8.3900e-003	1.3708	0.3618	7.7300e-003	0.3695	0.0000	1,139.8716	1,139.8716	0.0285	0.0000	1,140.5852
Total	**0.6220**	**2.3126**	**4.6365**	**0.0173**	**1.4786**	**0.0192**	**1.4978**	**0.3953**	**0.0181**	**0.4134**	**0.0000**	**1,592.2066**	**1,592.2066**	**0.0647**	**0.0000**	**1,593.8241**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2321	2.1009	1.8449	2.9500e-003		0.1223	0.1223		0.1150	0.1150	0.0000	253.6126	253.6126	0.0619	0.0000	255.1594
Total	**0.2321**	**2.1009**	**1.8449**	**2.9500e-003**		**0.1223**	**0.1223**		**0.1150**	**0.1150**	**0.0000**	**253.6126**	**253.6126**	**0.0619**	**0.0000**	**255.1594**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0523	1.9134	0.3743	4.7300e-003	0.1162	0.0108	0.1270	0.0335	0.0104	0.0439	0.0000	452.3350	452.3350	0.0362	0.0000	453.2389
Worker	0.5697	0.3992	4.2622	0.0126	1.3624	8.3900e-003	1.3708	0.3618	7.7300e-003	0.3695	0.0000	1,139.8716	1,139.8716	0.0285	0.0000	1,140.5852
Total	**0.6220**	**2.3126**	**4.6365**	**0.0173**	**1.4786**	**0.0192**	**1.4978**	**0.3953**	**0.0181**	**0.4134**	**0.0000**	**1,592.2066**	**1,592.2066**	**0.0647**	**0.0000**	**1,593.8241**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2481	2.2749	2.1631	3.5100e-003		0.1251	0.1251		0.1176	0.1176	0.0000	302.2867	302.2867	0.0729	0.0000	304.1099
Total	**0.2481**	**2.2749**	**2.1631**	**3.5100e-003**		**0.1251**	**0.1251**		**0.1176**	**0.1176**	**0.0000**	**302.2867**	**302.2867**	**0.0729**	**0.0000**	**304.1099**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Vendor	0.0523	2.0443	0.3933	5.5900e-003	0.1385	3.9100e-003	0.1424	0.0400	3.7400e-003	0.0437	0.0000	534.8868	534.8868	0.0408	0.0000	535.9069
Worker	0.6334	0.4268	4.6505	0.0145	1.6237	9.7300e-003	1.6334	0.4312	8.9600e-003	0.4401	0.0000	1,313.0572	1,313.0572	0.0306	0.0000	1,313.8218
Total	**0.6857**	**2.4711**	**5.0438**	**0.0201**	**1.7622**	**0.0136**	**1.7758**	**0.4711**	**0.0127**	**0.4838**	**0.0000**	**1,847.9440**	**1,847.9440**	**0.0714**	**0.0000**	**1,849.7288**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2481	2.2749	2.1631	3.5100e-003		0.1251	0.1251		0.1176	0.1176	0.0000	302.2863	302.2863	0.0729	0.0000	304.1095
Total	**0.2481**	**2.2749**	**2.1631**	**3.5100e-003**		**0.1251**	**0.1251**		**0.1176**	**0.1176**	**0.0000**	**302.2863**	**302.2863**	**0.0729**	**0.0000**	**304.1095**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0523	2.0443	0.3933	5.5900e-003	0.1385	3.9100e-003	0.1424	0.0400	3.7400e-003	0.0437	0.0000	534.8868	534.8868	0.0408	0.0000	535.9069
Worker	0.6334	0.4268	4.6505	0.0145	1.6237	9.7300e-003	1.6334	0.4312	8.9600e-003	0.4401	0.0000	1,313.0572	1,313.0572	0.0306	0.0000	1,313.8218
Total	**0.6857**	**2.4711**	**5.0438**	**0.0201**	**1.7622**	**0.0136**	**1.7758**	**0.4711**	**0.0127**	**0.4838**	**0.0000**	**1,847.9440**	**1,847.9440**	**0.0714**	**0.0000**	**1,849.7288**

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2218	2.0300	2.1272	3.5000e-003		0.1052	0.1052		0.0990	0.0990	0.0000	301.2428	301.2428	0.0722	0.0000	303.0471
Total	**0.2218**	**2.0300**	**2.1272**	**3.5000e-003**		**0.1052**	**0.1052**		**0.0990**	**0.0990**	**0.0000**	**301.2428**	**301.2428**	**0.0722**	**0.0000**	**303.0471**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0486	1.9185	0.3649	5.5200e-003	0.1379	3.2800e-003	0.1412	0.0398	3.1300e-003	0.0429	0.0000	528.2540	528.2540	0.0385	0.0000	529.2168
Worker	0.5912	0.3825	4.2676	0.0139	1.6175	9.4400e-003	1.6269	0.4295	8.6900e-003	0.4382	0.0000	1,260.2946	1,260.2946	0.0274	0.0000	1,260.9792
Total	**0.6398**	**2.3011**	**4.6326**	**0.0195**	**1.7554**	**0.0127**	**1.7681**	**0.4693**	**0.0118**	**0.4811**	**0.0000**	**1,788.5486**	**1,788.5486**	**0.0659**	**0.0000**	**1,790.1960**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2218	2.0300	2.1272	3.5000e-003		0.1052	0.1052		0.0990	0.0990	0.0000	301.2425	301.2425	0.0722	0.0000	303.0467
Total	**0.2218**	**2.0300**	**2.1272**	**3.5000e-003**		**0.1052**	**0.1052**		**0.0990**	**0.0990**	**0.0000**	**301.2425**	**301.2425**	**0.0722**	**0.0000**	**303.0467**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0486	1.9185	0.3649	5.5200e-003	0.1379	3.2800e-003	0.1412	0.0398	3.1300e-003	0.0429	0.0000	528.2540	528.2540	0.0385	0.0000	529.2168
Worker	0.5912	0.3825	4.2676	0.0139	1.6175	9.4400e-003	1.6269	0.4295	8.6900e-003	0.4382	0.0000	1,260.2946	1,260.2946	0.0274	0.0000	1,260.9792
Total	**0.6398**	**2.3011**	**4.6326**	**0.0195**	**1.7554**	**0.0127**	**1.7681**	**0.4693**	**0.0118**	**0.4811**	**0.0000**	**1,788.5486**	**1,788.5486**	**0.0659**	**0.0000**	**1,790.1960**

3.6 Paving - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.6 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0284	0.2803	0.4011	6.3000e-004		0.0140	0.0140		0.0129	0.0129	0.0000	55.0739	55.0739	0.0178	0.0000	55.5192
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0284**	**0.2803**	**0.4011**	**6.3000e-004**		**0.0140**	**0.0140**		**0.0129**	**0.0129**	**0.0000**	**55.0739**	**55.0739**	**0.0178**	**0.0000**	**55.5192**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5600e-003	9.7000e-004	0.0110	4.0000e-005	4.5300e-003	3.0000e-005	4.5600e-003	1.2000e-003	2.0000e-005	1.2300e-003	0.0000	3.3986	3.3986	7.0000e-005	0.0000	3.4003
Total	**1.5600e-003**	**9.7000e-004**	**0.0110**	**4.0000e-005**	**4.5300e-003**	**3.0000e-005**	**4.5600e-003**	**1.2000e-003**	**2.0000e-005**	**1.2300e-003**	**0.0000**	**3.3986**	**3.3986**	**7.0000e-005**	**0.0000**	**3.4003**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0284	0.2803	0.4011	6.3000e-004		0.0140	0.0140		0.0129	0.0129	0.0000	55.0738	55.0738	0.0178	0.0000	55.5191
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0284**	**0.2803**	**0.4011**	**6.3000e-004**		**0.0140**	**0.0140**		**0.0129**	**0.0129**	**0.0000**	**55.0738**	**55.0738**	**0.0178**	**0.0000**	**55.5191**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Worker	1.5600e-003	9.7000e-004	0.0110	4.0000e-005	4.5300e-003	3.0000e-005	4.5600e-003	1.2000e-003	2.0000e-005	1.2300e-003	0.0000	3.3986	3.3986	7.0000e-005	0.0000	3.4003
Total	**1.5600e-003**	**9.7000e-004**	**0.0110**	**4.0000e-005**	**4.5300e-003**	**3.0000e-005**	**4.5600e-003**	**1.2000e-003**	**2.0000e-005**	**1.2300e-003**	**0.0000**	**3.3986**	**3.3986**	**7.0000e-005**	**0.0000**	**3.4003**

3.7 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	4.9182					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.2700e-003	0.0358	0.0498	8.0000e-005		1.9500e-003	1.9500e-003		1.9500e-003	1.9500e-003	0.0000	7.0215	7.0215	4.2000e-004	0.0000	7.0320
Total	**4.9235**	**0.0358**	**0.0498**	**8.0000e-005**		**1.9500e-003**	**1.9500e-003**		**1.9500e-003**	**1.9500e-003**	**0.0000**	**7.0215**	**7.0215**	**4.2000e-004**	**0.0000**	**7.0320**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0235	0.0146	0.1661	5.7000e-004	0.0683	3.9000e-004	0.0687	0.0181	3.6000e-004	0.0185	0.0000	51.2059	51.2059	1.0400e-003	0.0000	51.2318
Total	**0.0235**	**0.0146**	**0.1661**	**5.7000e-004**	**0.0683**	**3.9000e-004**	**0.0687**	**0.0181**	**3.6000e-004**	**0.0185**	**0.0000**	**51.2059**	**51.2059**	**1.0400e-003**	**0.0000**	**51.2318**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	4.9182					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.2700e-003	0.0358	0.0498	8.0000e-005		1.9500e-003	1.9500e-003		1.9500e-003	1.9500e-003	0.0000	7.0214	7.0214	4.2000e-004	0.0000	7.0319
Total	**4.9235**	**0.0358**	**0.0498**	**8.0000e-005**		**1.9500e-003**	**1.9500e-003**		**1.9500e-003**	**1.9500e-003**	**0.0000**	**7.0214**	**7.0214**	**4.2000e-004**	**0.0000**	**7.0319**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0235	0.0146	0.1661	5.7000e-004	0.0683	3.9000e-004	0.0687	0.0181	3.6000e-004	0.0185	0.0000	51.2059	51.2059	1.0400e-003	0.0000	51.2318
Total	**0.0235**	**0.0146**	**0.1661**	**5.7000e-004**	**0.0683**	**3.9000e-004**	**0.0687**	**0.0181**	**3.6000e-004**	**0.0185**	**0.0000**	**51.2059**	**51.2059**	**1.0400e-003**	**0.0000**	**51.2318**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	88.5135	811.5865	1,120.3138	7.2770	726.8575	2.9487	729.8062	194.5401	2.7494	197.2894	0.0000	679,180.8759	679,180.8759	24.5946	0.0000	679,795.7406
Unmitigated	88.5135	811.5865	1,120.3138	7.2770	726.8575	2.9487	729.8062	194.5401	2.7494	197.2894	0.0000	679,180.8759	679,180.8759	24.5946	0.0000	679,795.7406

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	570,966.12	548,628.00	503134.32	1,907,060,214	1,907,060,214
Total	570,966.12	548,628.00	503,134.32	1,907,060,214	1,907,060,214

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Mid Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Mid Rise	0.565475	0.033834	0.192058	0.100675	0.009211	0.004032	0.016699	0.069908	0.001423	0.001062	0.004327	0.000756	0.000539

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	2,287.8421	2,287.8421	0.0945	0.0195	2,296.0269
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	2,287.8421	2,287.8421	0.0945	0.0195	2,296.0269
NaturalGas Mitigated	0.1254	1.0716	0.4560	6.8400e-003		0.0866	0.0866		0.0866	0.0866	0.0000	1,241.0444	1,241.0444	0.0238	0.0228	1,248.4193
NaturalGas Unmitigated	0.1254	1.0716	0.4560	6.8400e-003		0.0866	0.0866		0.0866	0.0866	0.0000	1,241.0444	1,241.0444	0.0238	0.0228	1,248.4193

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Mid Rise	2.32563e+007	0.1254	1.0716	0.4560	6.8400e-003		0.0866	0.0866		0.0866	0.0866	0.0000	1,241.0444	1,241.0444	0.0238	0.0228	1,248.4193
Total		**0.1254**	**1.0716**	**0.4560**	**6.8400e-003**		**0.0866**	**0.0866**		**0.0866**	**0.0866**	**0.0000**	**1,241.0444**	**1,241.0444**	**0.0238**	**0.0228**	**1,248.4193**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Mid Rise	2.32563e+007	0.1254	1.0716	0.4560	6.8400e-003		0.0866	0.0866		0.0866	0.0866	0.0000	1,241.0444	1,241.0444	0.0238	0.0228	1,248.4193
Total		**0.1254**	**1.0716**	**0.4560**	**6.8400e-003**		**0.0866**	**0.0866**		**0.0866**	**0.0866**	**0.0000**	**1,241.0444**	**1,241.0444**	**0.0238**	**0.0228**	**1,248.4193**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	7.18044e+006	2,287.8421	0.0945	0.0195	2,296.0269
Total		**2,287.8421**	**0.0945**	**0.0195**	**2,296.0269**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	7.18044e+006	2,287.8421	0.0945	0.0195	2,296.0269
Total		**2,287.8421**	**0.0945**	**0.0195**	**2,296.0269**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	11.8043	0.5941	26.1476	0.0264		1.5909	1.5909		1.5909	1.5909	166.9764	347.3524	514.3288	0.5232	0.0113	530.7852
Unmitigated	11.8043	0.5941	26.1476	0.0264		1.5909	1.5909		1.5909	1.5909	166.9764	347.3524	514.3288	0.5232	0.0113	530.7852

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.4918					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	5.6804					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	5.1490	0.4077	9.9930	0.0255		1.5010	1.5010		1.5010	1.5010	166.9764	320.8712	487.8476	0.4980	0.0113	503.6738
Landscaping	0.4830	0.1864	16.1545	8.6000e-004		0.0899	0.0899		0.0899	0.0899	0.0000	26.4812	26.4812	0.0252	0.0000	27.1114

Total	**11.8043**	**0.5941**	**26.1476**	**0.0264**		**1.5909**	**1.5909**		**1.5909**	**1.5909**	**166.9764**	**347.3524**	**514.3288**	**0.5232**	**0.0113**	**530.7852**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.4918					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	5.6804					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	5.1490	0.4077	9.9930	0.0255		1.5010	1.5010		1.5010	1.5010	166.9764	320.8712	487.8476	0.4980	0.0113	503.6738
Landscaping	0.4830	0.1864	16.1545	8.6000e-004		0.0899	0.0899		0.0899	0.0899	0.0000	26.4812	26.4812	0.0252	0.0000	27.1114
Total	**11.8043**	**0.5941**	**26.1476**	**0.0264**		**1.5909**	**1.5909**		**1.5909**	**1.5909**	**166.9764**	**347.3524**	**514.3288**	**0.5232**	**0.0113**	**530.7852**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	685.9916	3.3644	0.0844	795.2487
Unmitigated	685.9916	3.3644	0.0844	795.2487

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	102.422 / 64.5705	685.9916	3.3644	0.0844	795.2487
Total		**685.9916**	**3.3644**	**0.0844**	**795.2487**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	102.422 / 64.5705	685.9916	3.3644	0.0844	795.2487
Total		**685.9916**	**3.3644**	**0.0844**	**795.2487**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	146.7868	8.6749	0.0000	363.6582
Unmitigated	146.7868	8.6749	0.0000	363.6582

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	723.12	146.7868	8.6749	0.0000	363.6582
Total		**146.7868**	**8.6749**	**0.0000**	**363.6582**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e

Land Use	tons	MT/yr			
Apartments Mid Rise	723.12	146.7868	8.6749	0.0000	363.6582
Total		**146.7868**	**8.6749**	**0.0000**	**363.6582**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

City of Murrieta General Plan Update - GP Update Proposed VMT

Riverside-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments Mid Rise	1,572.00	Dwelling Unit	41.37	1,572,000.00	4496

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2035
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Vehicle Trips - Adjusted trip rate to meet annual VMT provided by VRPA

Table Name	Column Name	Default Value	New Value
tblVehicleTrips	ST_TR	6.39	349.00
tblVehicleTrips	SU_TR	5.86	320.06
tblVehicleTrips	WD_TR	6.65	363.21

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	4.8490	54.5878	34.2653	0.0643	18.2675	2.3916	20.6591	9.9840	2.2003	12.1843	0.0000	6,367.5239	6,367.5239	1.9490	0.0000	6,416.2491
2020	8.3486	50.2577	65.6548	0.1960	13.7289	2.1753	15.0209	3.6654	2.0012	5.6570	0.0000	19,649.6807	19,649.6807	1.9481	0.0000	19,681.9185
2021	7.6599	36.0361	61.2003	0.1914	13.7289	1.0628	14.7916	3.6654	0.9982	4.6636	0.0000	19,196.9614	19,196.9614	1.2318	0.0000	19,227.7569
2022	7.0919	33.0348	57.5457	0.1866	13.7288	0.9065	14.6353	3.6654	0.8518	4.5171	0.0000	18,718.4537	18,718.4537	1.1811	0.0000	18,747.9819
2023	179.9749	10.2245	15.0563	0.0254	2.5262	0.5111	2.6111	0.6700	0.4703	0.7538	0.0000	2,511.7544	2,511.7544	0.7171	0.0000	2,513.3319
Maximum	**179.9749**	**54.5878**	**65.6548**	**0.1960**	**18.2675**	**2.3916**	**20.6591**	**9.9840**	**2.2003**	**12.1843**	**0.0000**	**19,649.6807**	**19,649.6807**	**1.9490**	**0.0000**	**19,681.9185**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	4.8490	54.5878	34.2653	0.0643	18.2675	2.3916	20.6591	9.9840	2.2003	12.1843	0.0000	6,367.5239	6,367.5239	1.9490	0.0000	6,416.2491
2020	8.3486	50.2577	65.6548	0.1960	13.7289	2.1753	15.0209	3.6654	2.0012	5.6570	0.0000	19,649.6807	19,649.6807	1.9481	0.0000	19,681.9185
2021	7.6599	36.0361	61.2003	0.1914	13.7289	1.0628	14.7916	3.6654	0.9982	4.6636	0.0000	19,196.9614	19,196.9614	1.2318	0.0000	19,227.7569
2022	7.0919	33.0348	57.5457	0.1866	13.7288	0.9065	14.6353	3.6654	0.8518	4.5171	0.0000	18,718.4537	18,718.4537	1.1811	0.0000	18,747.9819
2023	179.9749	10.2245	15.0563	0.0254	2.5262	0.5111	2.6111	0.6700	0.4703	0.7538	0.0000	2,511.7544	2,511.7544	0.7171	0.0000	2,513.3319
Maximum	**179.9749**	**54.5878**	**65.6548**	**0.1960**	**18.2675**	**2.3916**	**20.6591**	**9.9840**	**2.2003**	**12.1843**	**0.0000**	**19,649.6807**	**19,649.6807**	**1.9490**	**0.0000**	**19,681.9185**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	449.6052	34.1074	928.6796	2.0463		120.8017	120.8017		120.8017	120.8017	14,724.7957	28,529.5242	43,254.3199	44.1345	0.9994	44,655.5077
Energy	0.6871	5.8719	2.4987	0.0375		0.4748	0.4748		0.4748	0.4748		7,495.9851	7,495.9851	0.1437	0.1374	7,540.5300
Mobile	584.4622	4,543.5712	7,069.8579	43.1657	4,153.8578	16.5659	4,170.4237	1,110.2529	15.4455	1,125.6984		4,435,361.2053	4,435,361.2053	151.3155		4,439,144.0934
Total	**1,034.7545**	**4,583.5504**	**8,001.0362**	**45.2495**	**4,153.8578**	**137.8423**	**4,291.7001**	**1,110.2529**	**136.7219**	**1,246.9748**	**14,724.7957**	**4,471,386.7146**	**4,486,111.5104**	**195.5937**	**1.1368**	**4,491,340.1311**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	449.6052	34.1074	928.6796	2.0463		120.8017	120.8017		120.8017	120.8017	14,724.7957	28,529.5242	43,254.3199	44.1345	0.9994	44,655.5077
Energy	0.6871	5.8719	2.4987	0.0375		0.4748	0.4748		0.4748	0.4748		7,495.9851	7,495.9851	0.1437	0.1374	7,540.5300
Mobile	584.4622	4,543.5712	7,069.8579	43.1657	4,153.8578	16.5659	4,170.4237	1,110.2529	15.4455	1,125.6984		4,435,361.2053	4,435,361.2053	151.3155		4,439,144.0934
Total	**1,034.7545**	**4,583.5504**	**8,001.0362**	**45.2495**	**4,153.8578**	**137.8423**	**4,291.7001**	**1,110.2529**	**136.7219**	**1,246.9748**	**14,724.7957**	**4,471,386.7146**	**4,486,111.5104**	**195.5937**	**1.1368**	**4,491,340.1311**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	7/29/2019	10/4/2019	5	50	
2	Site Preparation	Site Preparation	10/5/2019	11/15/2019	5	30	
3	Grading	Grading	11/16/2019	2/28/2020	5	75	
4	Building Construction	Building Construction	2/29/2020	12/30/2022	5	740	
5	Paving	Paving	12/31/2022	3/17/2023	5	55	
6	Architectural Coating	Architectural Coating	3/18/2023	6/2/2023	5	55	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 187.5

Acres of Paving: 0

Residential Indoor: 3,183,300; Residential Outdoor: 1,061,100; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38

Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	1,132.00	168.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	226.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.5134	35.7830	22.0600	0.0388		1.7949	1.7949		1.6697	1.6697		3,816.8994	3,816.8994	1.0618		3,843.4451
Total	**3.5134**	**35.7830**	**22.0600**	**0.0388**		**1.7949**	**1.7949**		**1.6697**	**1.6697**		**3,816.8994**	**3,816.8994**	**1.0618**		**3,843.4451**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0826	0.0507	0.6664	1.7100e-003	0.1677	1.0300e-003	0.1687	0.0445	9.5000e-004	0.0454		170.6284	170.6284	4.7800e-003		170.7478
Total	**0.0826**	**0.0507**	**0.6664**	**1.7100e-003**	**0.1677**	**1.0300e-003**	**0.1687**	**0.0445**	**9.5000e-004**	**0.0454**		**170.6284**	**170.6284**	**4.7800e-003**		**170.7478**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.5134	35.7830	22.0600	0.0388		1.7949	1.7949		1.6697	1.6697	0.0000	3,816.8994	3,816.8994	1.0618		3,843.4451
Total	**3.5134**	**35.7830**	**22.0600**	**0.0388**		**1.7949**	**1.7949**		**1.6697**	**1.6697**	**0.0000**	**3,816.8994**	**3,816.8994**	**1.0618**		**3,843.4451**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0826	0.0507	0.6664	1.7100e-003	0.1677	1.0300e-003	0.1687	0.0445	9.5000e-004	0.0454		170.6284	170.6284	4.7800e-003		170.7478
Total	**0.0826**	**0.0507**	**0.6664**	**1.7100e-003**	**0.1677**	**1.0300e-003**	**0.1687**	**0.0445**	**9.5000e-004**	**0.0454**		**170.6284**	**170.6284**	**4.7800e-003**		**170.7478**

3.3 Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.3350	45.5727	22.0630	0.0380		2.3904	2.3904		2.1991	2.1991		3,766.4529	3,766.4529	1.1917		3,796.2445
Total	**4.3350**	**45.5727**	**22.0630**	**0.0380**	**18.0663**	**2.3904**	**20.4566**	**9.9307**	**2.1991**	**12.1298**		**3,766.4529**	**3,766.4529**	**1.1917**		**3,796.2445**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0991	0.0608	0.7997	2.0600e-003	0.2012	1.2400e-003	0.2024	0.0534	1.1400e-003	0.0545		204.7540	204.7540	5.7300e-003		204.8973
Total	**0.0991**	**0.0608**	**0.7997**	**2.0600e-003**	**0.2012**	**1.2400e-003**	**0.2024**	**0.0534**	**1.1400e-003**	**0.0545**		**204.7540**	**204.7540**	**5.7300e-003**		**204.8973**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.3350	45.5727	22.0630	0.0380		2.3904	2.3904		2.1991	2.1991	0.0000	3,766.4529	3,766.4529	1.1917		3,796.2445
Total	**4.3350**	**45.5727**	**22.0630**	**0.0380**	**18.0663**	**2.3904**	**20.4566**	**9.9307**	**2.1991**	**12.1298**	**0.0000**	**3,766.4529**	**3,766.4529**	**1.1917**		**3,796.2445**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0991	0.0608	0.7997	2.0600e-003	0.2012	1.2400e-003	0.2024	0.0534	1.1400e-003	0.0545		204.7540	204.7540	5.7300e-003		204.8973
Total	**0.0991**	**0.0608**	**0.7997**	**2.0600e-003**	**0.2012**	**1.2400e-003**	**0.2024**	**0.0534**	**1.1400e-003**	**0.0545**		**204.7540**	**204.7540**	**5.7300e-003**		**204.8973**

3.4 Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	4.7389	54.5202	33.3768	0.0620		2.3827	2.3827		2.1920	2.1920		6,140.0195	6,140.0195	1.9426		6,188.5854
Total	**4.7389**	**54.5202**	**33.3768**	**0.0620**	**8.6733**	**2.3827**	**11.0560**	**3.5965**	**2.1920**	**5.7885**		**6,140.0195**	**6,140.0195**	**1.9426**		**6,188.5854**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1101	0.0676	0.8885	2.2900e-003	0.2236	1.3800e-003	0.2249	0.0593	1.2700e-003	0.0606		227.5045	227.5045	6.3700e-003		227.6637
Total	**0.1101**	**0.0676**	**0.8885**	**2.2900e-003**	**0.2236**	**1.3800e-003**	**0.2249**	**0.0593**	**1.2700e-003**	**0.0606**		**227.5045**	**227.5045**	**6.3700e-003**		**227.6637**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	4.7389	54.5202	33.3768	0.0620		2.3827	2.3827		2.1920	2.1920	0.0000	6,140.0195	6,140.0195	1.9426		6,188.5854
Total	**4.7389**	**54.5202**	**33.3768**	**0.0620**	**8.6733**	**2.3827**	**11.0560**	**3.5965**	**2.1920**	**5.7885**	**0.0000**	**6,140.0195**	**6,140.0195**	**1.9426**		**6,188.5854**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1101	0.0676	0.8885	2.2900e-003	0.2236	1.3800e-003	0.2249	0.0593	1.2700e-003	0.0606		227.5045	227.5045	6.3700e-003		227.6637
Total	**0.1101**	**0.0676**	**0.8885**	**2.2900e-003**	**0.2236**	**1.3800e-003**	**0.2249**	**0.0593**	**1.2700e-003**	**0.0606**		**227.5045**	**227.5045**	**6.3700e-003**		**227.6637**

3.4 Grading - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	4.4501	50.1975	31.9583	0.0620		2.1739	2.1739		2.0000	2.0000		6,005.8653	6,005.8653	1.9424		6,054.4257
Total	**4.4501**	**50.1975**	**31.9583**	**0.0620**	**8.6733**	**2.1739**	**10.8472**	**3.5965**	**2.0000**	**5.5965**		**6,005.8653**	**6,005.8653**	**1.9424**		**6,054.4257**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1018	0.0602	0.8064	2.2100e-003	0.2236	1.3500e-003	0.2249	0.0593	1.2500e-003	0.0605		220.3189	220.3189	5.6500e-003		220.4601
Total	**0.1018**	**0.0602**	**0.8064**	**2.2100e-003**	**0.2236**	**1.3500e-003**	**0.2249**	**0.0593**	**1.2500e-003**	**0.0605**		**220.3189**	**220.3189**	**5.6500e-003**		**220.4601**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	4.4501	50.1975	31.9583	0.0620		2.1739	2.1739		2.0000	2.0000	0.0000	6,005.8653	6,005.8653	1.9424		6,054.4257
Total	**4.4501**	**50.1975**	**31.9583**	**0.0620**	**8.6733**	**2.1739**	**10.8472**	**3.5965**	**2.0000**	**5.5965**	**0.0000**	**6,005.8653**	**6,005.8653**	**1.9424**		**6,054.4257**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1018	0.0602	0.8064	2.2100e-003	0.2236	1.3500e-003	0.2249	0.0593	1.2500e-003	0.0605		220.3189	220.3189	5.6500e-003		220.4601
Total	**0.1018**	**0.0602**	**0.8064**	**2.2100e-003**	**0.2236**	**1.3500e-003**	**0.2249**	**0.0593**	**1.2500e-003**	**0.0605**		**220.3189**	**220.3189**	**5.6500e-003**		**220.4601**

3.5 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.1198	19.1860	16.8485	0.0269		1.1171	1.1171		1.0503	1.0503		2,553.0631	2,553.0631	0.6229		2,568.6345
Total	**2.1198**	**19.1860**	**16.8485**	**0.0269**		**1.1171**	**1.1171**		**1.0503**	**1.0503**		**2,553.0631**	**2,553.0631**	**0.6229**		**2,568.6345**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4683	17.2858	3.1623	0.0439	1.0758	0.0983	1.1741	0.3098	0.0941	0.4038		4,626.5675	4,626.5675	0.3470		4,635.2429
Worker	5.7605	3.4068	45.6439	0.1252	12.6531	0.0766	12.7297	3.3557	0.0706	3.4262		12,470.0502	12,470.0502	0.3196		12,478.0411
Total	**6.2288**	**20.6926**	**48.8063**	**0.1691**	**13.7289**	**0.1749**	**13.9038**	**3.6654**	**0.1646**	**3.8300**		**17,096.6177**	**17,096.6177**	**0.6667**		**17,113.2840**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.1198	19.1860	16.8485	0.0269		1.1171	1.1171		1.0503	1.0503	0.0000	2,553.0631	2,553.0631	0.6229		2,568.6345
Total	**2.1198**	**19.1860**	**16.8485**	**0.0269**		**1.1171**	**1.1171**		**1.0503**	**1.0503**	**0.0000**	**2,553.0631**	**2,553.0631**	**0.6229**		**2,568.6345**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4683	17.2858	3.1623	0.0439	1.0758	0.0983	1.1741	0.3098	0.0941	0.4038		4,626.5675	4,626.5675	0.3470		4,635.2429
Worker	5.7605	3.4068	45.6439	0.1252	12.6531	0.0766	12.7297	3.3557	0.0706	3.4262		12,470.0502	12,470.0502	0.3196		12,478.0411
Total	**6.2288**	**20.6926**	**48.8063**	**0.1691**	**13.7289**	**0.1749**	**13.9038**	**3.6654**	**0.1646**	**3.8300**		**17,096.6177**	**17,096.6177**	**0.6667**		**17,113.2840**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013		2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**		**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3922	15.5466	2.7738	0.0435	1.0758	0.0296	1.1053	0.3097	0.0283	0.3380		4,590.6172	4,590.6172	0.3284		4,598.8275
Worker	5.3668	3.0574	41.8514	0.1210	12.6531	0.0746	12.7277	3.3557	0.0687	3.4243		12,052.9803	12,052.9803	0.2874		12,060.1652
Total	**5.7590**	**18.6040**	**44.6251**	**0.1645**	**13.7289**	**0.1041**	**13.8330**	**3.6654**	**0.0969**	**3.7623**		**16,643.5975**	**16,643.5975**	**0.6158**		**16,658.9927**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013	0.0000	2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**	**0.0000**	**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3922	15.5466	2.7738	0.0435	1.0758	0.0296	1.1053	0.3097	0.0283	0.3380		4,590.6172	4,590.6172	0.3284		4,598.8275
Worker	5.3668	3.0574	41.8514	0.1210	12.6531	0.0746	12.7277	3.3557	0.0687	3.4243		12,052.9803	12,052.9803	0.2874		12,060.1652
Total	**5.7590**	**18.6040**	**44.6251**	**0.1645**	**13.7289**	**0.1041**	**13.8330**	**3.6654**	**0.0969**	**3.7623**		**16,643.5975**	**16,643.5975**	**0.6158**		**16,658.9927**

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612		2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**		**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3657	14.6677	2.5799	0.0431	1.0757	0.0249	1.1006	0.3097	0.0238	0.3335		4,551.5430	4,551.5430	0.3110		4,559.3188
Worker	5.0199	2.7515	38.6023	0.1165	12.6531	0.0726	12.7257	3.3557	0.0668	3.4225		11,612.5772	11,612.5772	0.2582		11,619.0309
Total	**5.3856**	**17.4192**	**41.1823**	**0.1597**	**13.7288**	**0.0975**	**13.8263**	**3.6654**	**0.0906**	**3.7560**		**16,164.1202**	**16,164.1202**	**0.5692**		**16,178.3497**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612	0.0000	2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**	**0.0000**	**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.3657	14.6677	2.5799	0.0431	1.0757	0.0249	1.1006	0.3097	0.0238	0.3335		4,551.5430	4,551.5430	0.3110		4,559.3188
Worker	5.0199	2.7515	38.6023	0.1165	12.6531	0.0726	12.7257	3.3557	0.0668	3.4225		11,612.5772	11,612.5772	0.2582		11,619.0309
Total	**5.3856**	**17.4192**	**41.1823**	**0.1597**	**13.7288**	**0.0975**	**13.8263**	**3.6654**	**0.0906**	**3.7560**		**16,164.1202**	**16,164.1202**	**0.5692**		**16,178.3497**

3.6 Paving - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1028	11.1249	14.5805	0.0228		0.5679	0.5679		0.5225	0.5225		2,207.6603	2,207.6603	0.7140		2,225.5104
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.1028**	**11.1249**	**14.5805**	**0.0228**		**0.5679**	**0.5679**		**0.5225**	**0.5225**		**2,207.6603**	**2,207.6603**	**0.7140**		**2,225.5104**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0665	0.0365	0.5115	1.5400e-003	0.1677	9.6000e-004	0.1686	0.0445	8.9000e-004	0.0454		153.8769	153.8769	3.4200e-003		153.9624
Total	**0.0665**	**0.0365**	**0.5115**	**1.5400e-003**	**0.1677**	**9.6000e-004**	**0.1686**	**0.0445**	**8.9000e-004**	**0.0454**		**153.8769**	**153.8769**	**3.4200e-003**		**153.9624**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1028	11.1249	14.5805	0.0228		0.5679	0.5679		0.5225	0.5225	0.0000	2,207.6603	2,207.6603	0.7140		2,225.5104
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.1028**	**11.1249**	**14.5805**	**0.0228**		**0.5679**	**0.5679**		**0.5225**	**0.5225**	**0.0000**	**2,207.6603**	**2,207.6603**	**0.7140**		**2,225.5104**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0665	0.0365	0.5115	1.5400e-003	0.1677	9.6000e-004	0.1686	0.0445	8.9000e-004	0.0454		153.8769	153.8769	3.4200e-003		153.9624
Total	**0.0665**	**0.0365**	**0.5115**	**1.5400e-003**	**0.1677**	**9.6000e-004**	**0.1686**	**0.0445**	**8.9000e-004**	**0.0454**		**153.8769**	**153.8769**	**3.4200e-003**		**153.9624**

3.6 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0327	10.1917	14.5842	0.0228		0.5102	0.5102		0.4694	0.4694		2,207.5841	2,207.5841	0.7140		2,225.4336
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0327**	**10.1917**	**14.5842**	**0.0228**		**0.5102**	**0.5102**		**0.4694**	**0.4694**		**2,207.5841**	**2,207.5841**	**0.7140**		**2,225.4336**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0624	0.0329	0.4721	1.4900e-003	0.1677	9.4000e-004	0.1686	0.0445	8.6000e-004	0.0453		148.0292	148.0292	3.0700e-003		148.1059
Total	**0.0624**	**0.0329**	**0.4721**	**1.4900e-003**	**0.1677**	**9.4000e-004**	**0.1686**	**0.0445**	**8.6000e-004**	**0.0453**		**148.0292**	**148.0292**	**3.0700e-003**		**148.1059**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0327	10.1917	14.5842	0.0228		0.5102	0.5102		0.4694	0.4694	0.0000	2,207.5841	2,207.5841	0.7140		2,225.4336
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0327**	**10.1917**	**14.5842**	**0.0228**		**0.5102**	**0.5102**		**0.4694**	**0.4694**	**0.0000**	**2,207.5841**	**2,207.5841**	**0.7140**		**2,225.4336**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0624	0.0329	0.4721	1.4900e-003	0.1677	9.4000e-004	0.1686	0.0445	8.6000e-004	0.0453		148.0292	148.0292	3.0700e-003		148.1059
Total	**0.0624**	**0.0329**	**0.4721**	**1.4900e-003**	**0.1677**	**9.4000e-004**	**0.1686**	**0.0445**	**8.6000e-004**	**0.0453**		**148.0292**	**148.0292**	**3.0700e-003**		**148.1059**

3.7 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	178.8436					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708		281.4481	281.4481	0.0168		281.8690
Total	**179.0352**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**		**281.4481**	**281.4481**	**0.0168**		**281.8690**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.9397	0.4954	7.1125	0.0224	2.5262	0.0142	2.5403	0.6700	0.0130	0.6830		2,230.3063	2,230.3063	0.0463		2,231.4628
Total	**0.9397**	**0.4954**	**7.1125**	**0.0224**	**2.5262**	**0.0142**	**2.5403**	**0.6700**	**0.0130**	**0.6830**		**2,230.3063**	**2,230.3063**	**0.0463**		**2,231.4628**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	178.8436					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708	0.0000	281.4481	281.4481	0.0168		281.8690
Total	**179.0352**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**	**0.0000**	**281.4481**	**281.4481**	**0.0168**		**281.8690**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.9397	0.4954	7.1125	0.0224	2.5262	0.0142	2.5403	0.6700	0.0130	0.6830		2,230.3063	2,230.3063	0.0463		2,231.4628
Total	**0.9397**	**0.4954**	**7.1125**	**0.0224**	**2.5262**	**0.0142**	**2.5403**	**0.6700**	**0.0130**	**0.6830**		**2,230.3063**	**2,230.3063**	**0.0463**		**2,231.4628**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	584.4622	4,543.5712	7,069.8579	43.1657	4,153.8578	16.5659	4,170.4237	1,110.2529	15.4455	1,125.6984		4,435,361.2053	4,435,361.2053	151.3155		4,439,144.0934

Unmitigated	584.4622	4,543.5712	7,069.8579	43.1657	4,153.8578	16.5659	4,170.4237	1,110.2529	15.4455	1,125.6984		4,435,361.2053	4,435,361.2053	151.3155		4,439,144.0934

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	570,966.12	548,628.00	503134.32	1,907,060,214	1,907,060,214
Total	570,966.12	548,628.00	503,134.32	1,907,060,214	1,907,060,214

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Mid Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Mid Rise	0.565475	0.033834	0.192058	0.100675	0.009211	0.004032	0.016699	0.069908	0.001423	0.001062	0.004327	0.000756	0.000539

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.6871	5.8719	2.4987	0.0375		0.4748	0.4748		0.4748	0.4748		7,495.9851	7,495.9851	0.1437	0.1374	7,540.5300
NaturalGas Unmitigated	0.6871	5.8719	2.4987	0.0375		0.4748	0.4748		0.4748	0.4748		7,495.9851	7,495.9851	0.1437	0.1374	7,540.5300

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Mid Rise	63715.9	0.6871	5.8719	2.4987	0.0375		0.4748	0.4748		0.4748	0.4748		7,495.9851	7,495.9851	0.1437	0.1374	7,540.5300
Total		**0.6871**	**5.8719**	**2.4987**	**0.0375**		**0.4748**	**0.4748**		**0.4748**	**0.4748**		**7,495.9851**	**7,495.9851**	**0.1437**	**0.1374**	**7,540.5300**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Mid Rise	63.7159	0.6871	5.8719	2.4987	0.0375		0.4748	0.4748		0.4748	0.4748		7,495.9851	7,495.9851	0.1437	0.1374	7,540.5300
Total		**0.6871**	**5.8719**	**2.4987**	**0.0375**		**0.4748**	**0.4748**		**0.4748**	**0.4748**		**7,495.9851**	**7,495.9851**	**0.1437**	**0.1374**	**7,540.5300**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	449.6052	34.1074	928.6796	2.0463		120.8017	120.8017		120.8017	120.8017	14,724.7957	28,529.5242	43,254.3199	44.1345	0.9994	44,655.5077
Unmitigated	449.6052	34.1074	928.6796	2.0463		120.8017	120.8017		120.8017	120.8017	14,724.7957	28,529.5242	43,254.3199	44.1345	0.9994	44,655.5077

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.6949					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	31.1256					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	411.9206	32.6164	799.4435	2.0395		120.0824	120.0824		120.0824	120.0824	14,724.7957	28,296.0000	43,020.7957	43.9122	0.9994	44,416.4259
Landscaping	3.8641	1.4910	129.2361	6.8500e-003		0.7192	0.7192		0.7192	0.7192		233.5242	233.5242	0.2223		239.0818
Total	**449.6052**	**34.1074**	**928.6796**	**2.0463**		**120.8017**	**120.8017**		**120.8017**	**120.8017**	**14,724.7957**	**28,529.5242**	**43,254.3199**	**44.1345**	**0.9994**	**44,655.5077**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.6949					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	31.1256					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	411.9206	32.6164	799.4435	2.0395		120.0824	120.0824		120.0824	120.0824	14,724.7957	28,296.0000	43,020.7957	43.9122	0.9994	44,416.4259
Landscaping	3.8641	1.4910	129.2361	6.8500e-003		0.7192	0.7192		0.7192	0.7192		233.5242	233.5242	0.2223		239.0818
Total	**449.6052**	**34.1074**	**928.6796**	**2.0463**		**120.8017**	**120.8017**		**120.8017**	**120.8017**	**14,724.7957**	**28,529.5242**	**43,254.3199**	**44.1345**	**0.9994**	**44,655.5077**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Emissions Calculations

Emission Estimates

	ROG	NOx	CO	SOx	PM10	PM2.5
2011 GENERAL PLAN INVENTORY						
Tons/Year						
Area Sources						
Natural Gas Combustion	14.23	188.52	109.40	0.00	0.35	0.35
Landscaping Equipment	48.10	3.02	267.22	0.01	0.71	0.70
Consumer Products	416.47	-	-	-	-	-
Architectural Coatings	78.67	-	-	-	-	-
Subtotal (Area Sources)	**557.47**	**191.54**	**376.62**	**0.01**	**1.06**	**1.05**
Indirect Sources						
Energy Consumption	4.47	514.00	0.09	53.70	17.90	-
Water Conveyance	0.11	12.60	2.20	1.32	0.44	-
Subtotal (Indirect Sources)	**4.58**	**526.60**	**2.29**	**55.02**	**18.34**	**0.00**
Mobile Sources (by land use category)						
Single Family Housing	425.40	594.36	5,090.88	5.76	992.57	193.26
Multifamily Housing	115.60	156.97	1,344.52	1.52	262.14	51.04
High School [civic/institutional]	18.14	26.37	217.64	0.25	43.98	8.55
City Park	8.81	8.80	72.34	0.08	14.66	2.85
Strip Mall	918.75	1,400.62	11,486.63	13.38	2,331.08	453.11
Professional Office	246.53	354.02	2,972.14	3.43	593.68	115.48
Office Park [business park]	180.87	560.13	2,200.81	2.53	437.33	85.09
General Light Industrial	15.17	21.00	177.83	0.20	35.31	6.87
Subtotal (Mobile Sources)	**1,929.27**	**3,122.27**	**23,562.79**	**27.15**	**4,710.75**	**916.25**
TOTAL	**2,491.32**	**3,840.41**	**23,941.70**	**82.18**	**4,730.15**	**917.30**
lb/Day						
Area Sources						
Natural Gas Combustion	77.97	1,032.99	599.45	0.00	1.92	1.92
Landscaping Equipment	263.56	16.55	1,464.22	0.05	3.89	3.84
Consumer Products	2,282.03	0.00	0.00	0.00	0.00	0.00
Architectural Coatings	431.07	0.00	0.00	0.00	0.00	0.00
Subtotal (Area Sources)	**3,054.63**	**1,049.53**	**2,063.67**	**0.05**	**5.81**	**5.75**
Indirect Sources						
Energy Consumption	24.49	2,816.44	0.49	294.25	98.08	0.00
Water Conveyance	0.60	69.04	12.05	7.23	2.41	0.00
Subtotal (Indirect Sources)	**25.10**	**2,885.48**	**12.55**	**301.48**	**100.49**	**0.00**
Mobile Sources (by land use category)						
Single Family Housing	2,330.96	3,256.77	27,895.23	31.56	5,438.74	1,058.96
Multifamily Housing	633.42	860.11	7,367.23	8.33	1,436.38	279.67
High School [civic/institutional]	99.40	144.49	1,192.55	1.37	240.99	46.85
City Park	48.27	48.22	396.38	0.44	80.33	15.62
Strip Mall	5,034.25	7,674.63	62,940.44	73.32	12,773.04	2,482.79
Professional Office	1,350.85	1,939.84	16,285.70	18.79	3,253.04	632.77
Office Park [business park]	991.07	3,069.21	12,059.23	13.86	2,396.33	466.25
General Light Industrial	83.12	115.07	974.41	1.10	193.48	37.64
Subtotal (Mobile Sources)	**10,571.34**	**17,108.33**	**129,111.18**	**148.77**	**25,812.33**	**5,020.55**
TOTAL	**13,651.07**	**21,043.34**	**131,187.40**	**450.30**	**25,918.63**	**5,026.30**
GENERAL PLAN UPDATE - Residential *Increase*						
lb/Day						
Area	38	1	129	0	1	1
Energy	0	4	2	0	0	0
TOTAL	**38**	**6**	**131**	**0**	**1**	**1**
GENERAL PLAN UPDATE - Non-Residential *Decrease*						
lb/Day						
Area	54	0	0	0	0	0
Energy	2	18	15	0	1	1
TOTAL	**56**	**18**	**15**	**0**	**1**	**1**
TOTAL DECREASE	-56	-18	-15	0	-1	-1
2011 GENERAL PLAN - Mobile						
lb/Day						
Mobile	594	4620	7189	44	4241	1145
GENERAL PLAN UPDATE - Mobile						
lb/Day						
Mobile	584	4544	7070	43	4170	1126
NET MOBILE EMISSIONS	-10	-77	-120	-1	-71	-19
GENERAL PLAN UPDATE NET TOTAL	**-27**	**-89**	**-4**	**-1**	**-71**	**-19**
Existing + Net	**3052**	**3846**	**2072**	**301**	**35**	**-14**
SCAQMD Thresholds	55	55	550	150	150	55
Threshold exceeded?	no	no	no	no	no	no

APPENDIX D
WATER STUDY FOR THE MURRIETA GENERAL PLAN UPDATE AND EASTERN MUNICIPAL WATER DISTRICT POTENTIAL ANNEX AREA

City of Murrieta General Plan Update

Water Study for the Murrieta General Plan Update and Eastern Municipal Water District Potential Annex Area

June 2019

Prepared for: Rick Engineering

City of Murrieta General Plan Update

Project No: W9Y23600
Document Title: Water Study for the Murrieta General Plan Update and Eastern Municipal Water District Potential Annex Area
Client Name: Prepared for: Rick Engineering
Project Manager: Leanne Hammond, PE

Jacobs Engineering Group Inc.

402 W. Broadway Suite 1450
San Diego, California 92101
United States
T +1.619.687.0110
F +1.619.687.0120
www.jacobs.com

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Document History and Status

Revision	Date	Description	By	Review	Approved

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1. Introduction and Purpose

The purpose of this study is to review potential water supply and water system impacts as a result of the proposed City of Murrieta (City) General Plan Update (GPU) as well as a potential Eastern Municipal Water District (EMWD) Annex Area (Potential EMWD Annex Area) that is currently not served by any water district.

The GPU includes a new land use designation (Innovation) and a revised mix and location of land use designations in six key areas as shown on General Plan Land Use Policy Map (Figure 1). Referring to Figure 1, the proposed GPU focused areas in the City are identified as Area 1 through 6. The Potential EMWD Annex Area, shown on Figure 1, is served by private wells, and is not currently located within any water district. No annexation into EMWD is proposed as part of the project; however, this water study includes a summary of procedures outline that EMWD and the Riverside County Local Agency Formation Committee (LAFCO) would require at this time as part of information needed for an annexation request by the City, should one be necessary in the future.

This water study evaluation and assessment of water system impacts on the General Plan update is based on the following scope of services:

- Review of key EMWD Water Planning Reports:
    - 2015 EMWD Urban Water Master Plan (UWMP)
    - 2016 EMWD Water Facilities Master Plan (WFMP)
- Summarize General Plan changes by land use and acreage
- Estimate increase/decrease in water use based on EMWD Master Plan criteria
- Review and summarize EMWD water supply and distribution capacities to the City of Murrieta
- Establish incremental increases in water demands from the proposed updated land use plan and annexation area
- Facilities assessment for the future annexation area
- Summarize study findings and recommendations

The following sections present an overview of the project, summarize water demand changes, water service evaluation, and facilities assessment for the GPU.

2. Water Districts in City of Murrieta

The City is served potable water by four water districts: Rancho California Water District, Elsinore Valley Water District, Western Municipal Water District, and EMWD. The water districts serving the City are shown in Figure 2. Area 1 through Area 6, depicted on Figure 1, receive water service from EMWD with a few exceptions where no water service is provided by any district. It is anticipated that future development in accordance with the GPU within areas not served by a water district would annex to the appropriate district for service and connection to the infrastructure systems.

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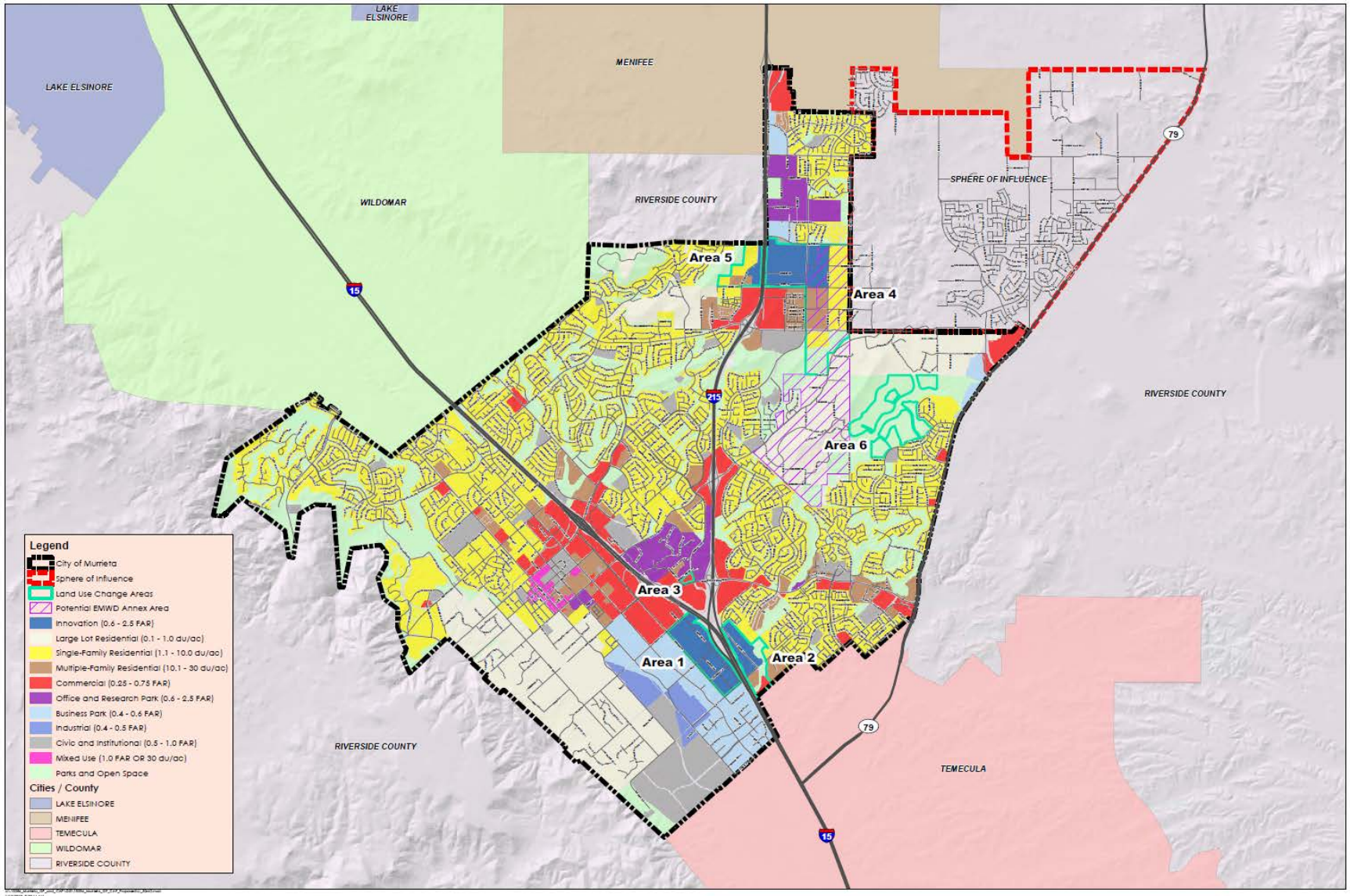
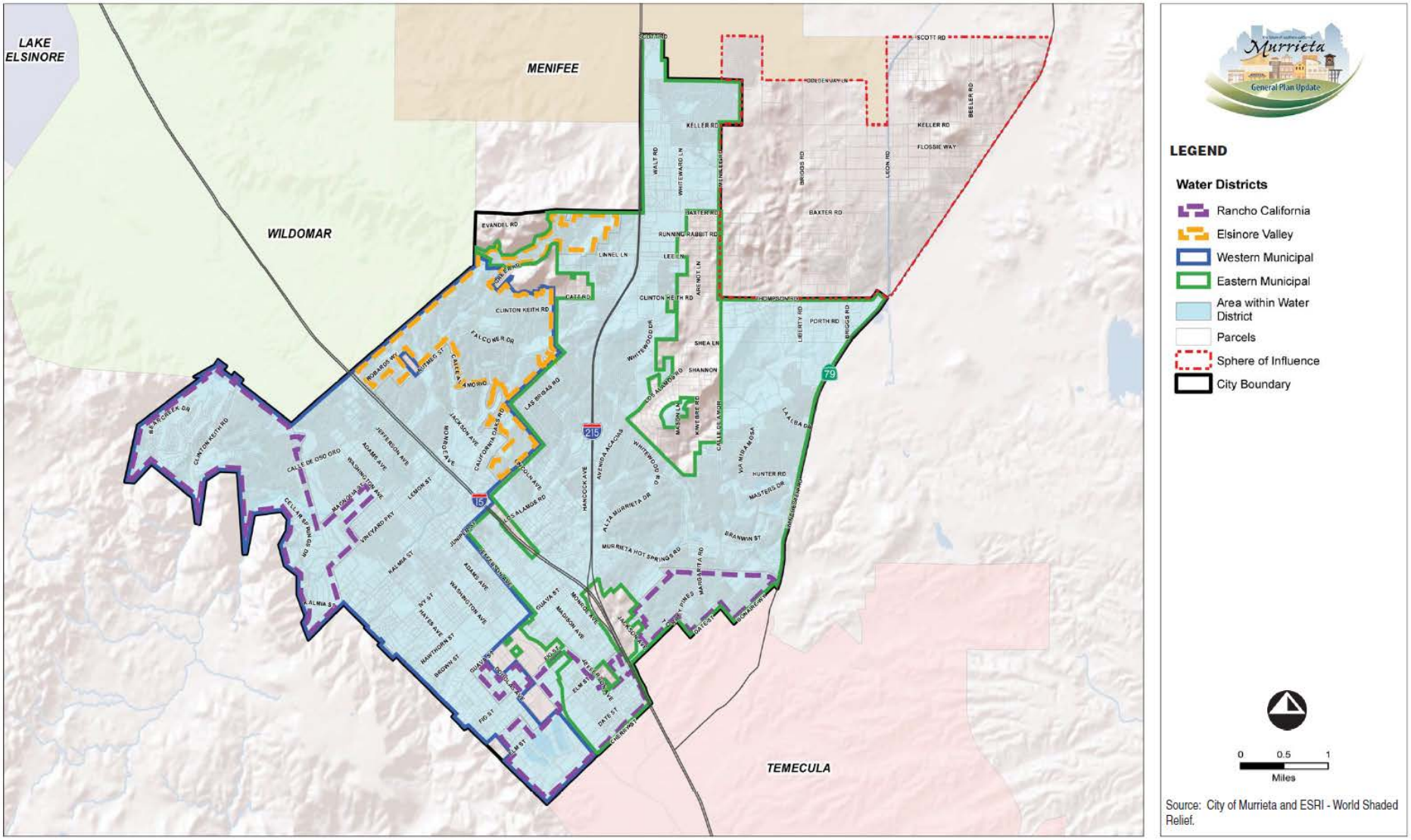
Figure 1. Proposed General Plan Land Use Policy Map



Source: Rick Engineering, 2019

Figure 2. City of Murrieta Water Districts



Source: City 2011 General Plan Update, Section 5.15

3. Overview of EMWD Services and Facilities

EMWD is the water, wastewater service and recycled water provider to more than 825,000 people living and working within a 555-square mile service area in western Riverside County. It is California's sixth-largest retail water agency. EMWD provides service to retail customers located within the cities of Moreno Valley, Menifee, Murrieta, and Temecula and several unincorporated communities of Riverside County. EMWD also supplies water on a wholesale basis to the Cities of Hemet, San Jacinto and Perris, Lake Hemet Municipal Water District, Nuevo Water Company, Elsinore Valley Municipal Water District, Western Municipal Water District and Rancho California Water District.

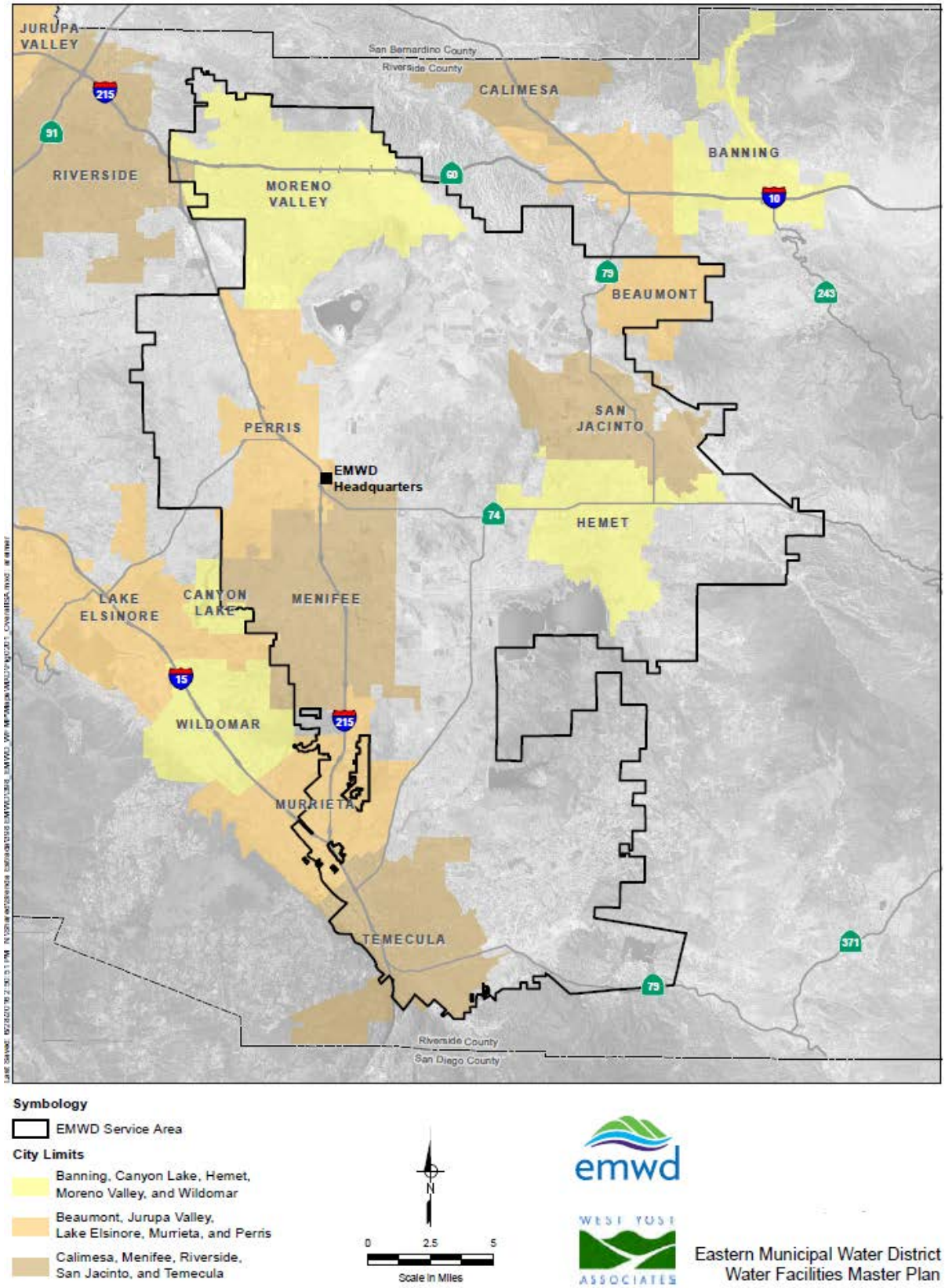
The City is partially located in the southerly portion of EMWD, as shown in Figure 3, within a service sub-area referred to as Temecula Valley and in close proximity to Metropolitan Water District's (MWD's) Robert F. Skinner (Skinner) Water Treatment Plant (WTP). EMWD serves the City with transmission mains, and multiple pressures systems to meet service pressures including pump station and water storage reservoirs. The EMWD 2016 WFMP evaluated this area and identified system improvements required to meet future demands. In general, the service area has sufficient water supply and distribution to support ultimate development of the City General Plan within its service area. Locations of key treatment and distribution facilities for EMWD and MWD are shown in reference figures from EWMD's 2015 UWMP within Appendix A.

EMWD has four sources of water supply: imported water from MWD, local groundwater, desalinated groundwater, and recycled water. Delivery points for each source of water are located throughout the EMWD service area and EMWD's groundwater management zones can be found in the reference figure within Appendix A. Potable imported water is treated and delivered to EMWD directly from MWD's two large filtration plants. The Henry J. Mills (Mills) Water Treatment Plant treats water from Northern California and provides it to EMWD through two connection points located in the northeast portion of EMWD's service area. The Skinner WTP treats a blend of Colorado River water and water from Northern California and provides it to EMWD through a connection point in the southwest portion of EMWD's service area. The major potable water facilities for EMWD are shown in Figure 4.

In addition to the potable water system, EMWD maintains a regional recycled water system that provides tertiary-treated recycled water to customers for agricultural, landscape irrigation, environmental, and industrial use. EMWD's recycled water system consists of four regional water reclamation facilities (RWRFs) that treat municipal sewage and produce water for recycling. The four RWRFs, the San Jacinto Valley RWRF, the Moreno Valley RWRF, the Temecula Valley RWRF, and the Perris Valley RWRF, are spread throughout EMWD's service area. An intricate web of pipelines connects the four RWRFs, as well as several distribution storage ponds, to manage the delivery of recycled water. Key EMWD recycled water facilities are show in the reference figure within Appendix A.

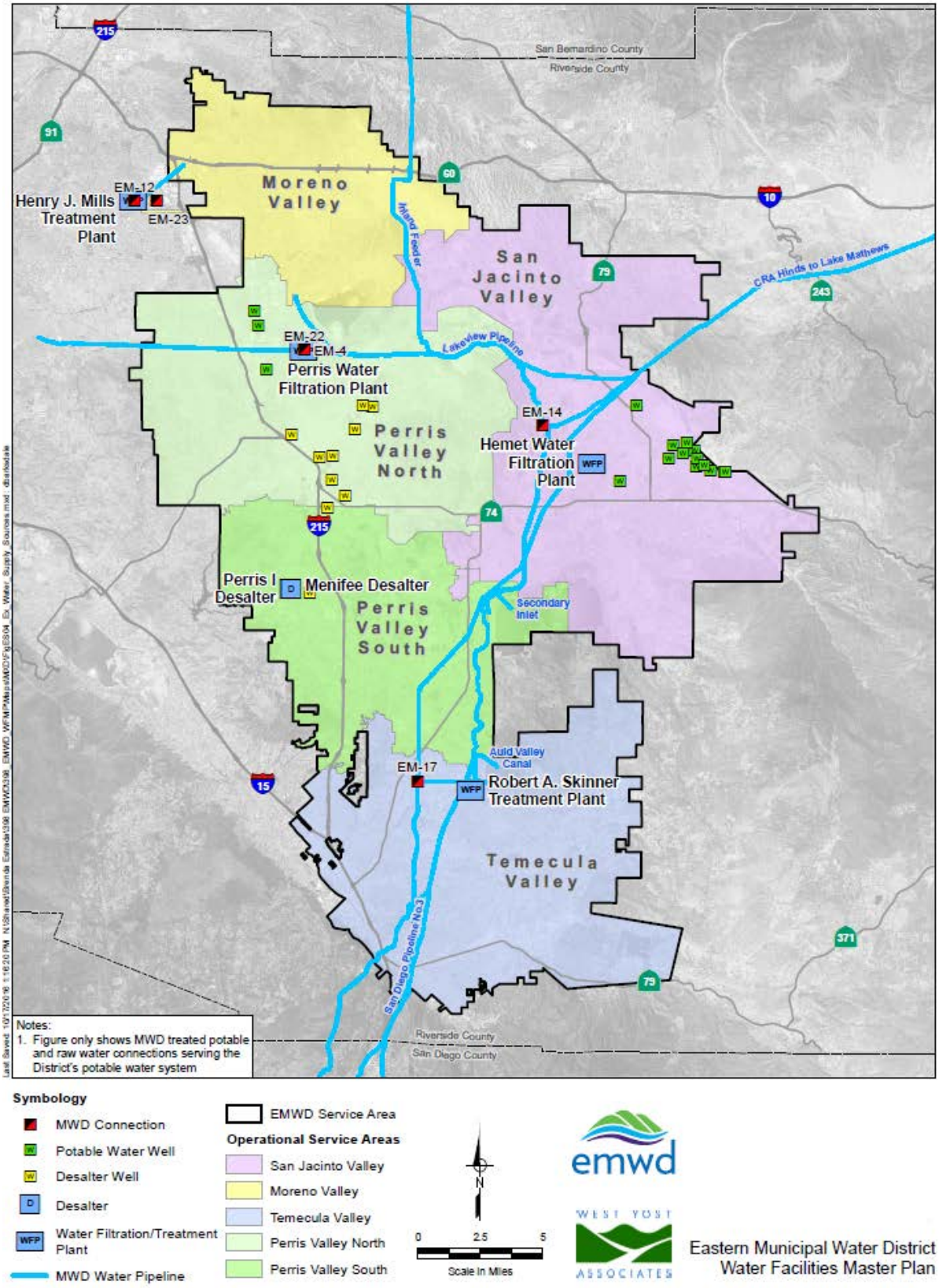
The City's currently approved 2011 General Plan is accounted for in the EMWD 2015 UWMP, which documents water supply and demands requirements to meet future forecasts 2040. The 2015 UWMP concludes that EMWD has sufficient supply capacities to meet demand conditions throughout its service area, which includes portions of the City.

Figure 3. EMWD Water Service Area



Source: EMWD 2016 WFMP

Figure 4. EMWD Major Potable Water Facilities



Source: EMWD 2016 WFMP

As noted above. the City of Murrieta is served potable and recycled water and wastewater by multiple districts, except for a few rural areas that are not currently within a water district, including the Potential EMWD Annex Area. As these rural areas develop in the future and depending on the densities proposed, the areas may be candidates for future annexation into their respective water district for public utility services. Future sections within this water study focus on the Potential EWMD Annex Area and impacts to the EMWD infrastructure.

New development would be required to pay its share of the costs of infrastructure improvements necessary to accommodate the project. Water districts would need to ensure their water reclamation facilities and pipeline infrastructure are planned and installed according to their UWMP projections and the respective water agency facility planning criteria. Additionally, coordination between the City and water districts would be essential as further development is planned. Furthermore, the City has identified the protection and conservation of its existing and future water resources within the proposed General Plan 2035 Infrastructure Element goals and policies.

4. Project Overview and Land Use

The General Plan Update focuses on a planned reduction in non-residential uses and a slight increase in residential uses. Table 1 presents a summary of the breakdown of the land use designation changes, as called out in the City General Plan Update.

Table 1. Land Use Designation Changes in Acreages

Land Use Designation	Existing Adopted GP Acreage	Proposed GP Acreage	Net Change in Acreage
Large Lot Residential	3,030.62	2,927.44	(103.18)
Single-Family Residential	6,255.31	6,215.73	(39.58)
Multiple-Family Residential	661.56	758.03	96.47
Innovation	0	520.79	520.79
Commercial	1,266.58	1,279.26	12.68
Office and Research Park	1,353.70	516.91	(836.79)
Business Park	717.35	717.35	0.00
Industrial	185.47	185.47	0.00
Civic and Institutional	1,064.88	1,064.81	(0.07)
Parks and Open Space	3,474.46	3,824.14	349.68
Mixed Use	59.68	59.68	0.00
Roads	3,441.07	3,441.07	0.00
Total	**21,510.68**	**21,510.68**	

The GPU's anticipated change in residential and non-residential components over the 2035 estimated buildout from the 2011 General Plan is as follows:

- Reduction of Large Lot and Single-Family Residential acreages
- Increase of Multi-Family Residential, Commercial, and Parks and Open Space
- Addition of new land use designation (Innovation)
- Decrease in Office and Research Park and Civic and Institutional

The water analysis section below includes an evaluation of the overall impact of these planned land use changes.

5. General Plan Update Analysis

5.1 Water Demand Analysis

The City is served by multiple water purveyors and each water agency utilizes their own water demand planning criteria. For the purposes of establishing the change in potential water demands resulting from the proposed GPU land use revisions, EMWD's potable water demand criteria, presented in their 2016 WFMP, has been used to estimate water demands for the GPU area. This approach is similar to the water supply analysis presented in the 2011 GPU supporting documentation, which used one blended unit demand set of criteria to establish project water use demands for the GPU area. The estimated Project demands have been calculated and are presented in Table 2.

Table 2. Project Water Demands Based on the GPU 2035 Buildout

Land Use Designation	GP Acreage	GP Dwelling Units	Unit Demand	Proposed Water Demand (gpd)
Large Lot Residential	2,927.44	908	660 gpd/DU	598,954
Single-Family Residential	6,215.73	30,146	440 gpd/DU	13,264,368
Multiple-Family Residential	758.03	14,115	290 gpd/DU	4,093,210
Innovation	520.79		2,200 gpd/ac	1,145,738
Commercial	1,279.26	4	2,200 gpd/ac	2,815,532
Office and Research Park	516.91	20	2,200 gpd/ac	1,143,002
Business Park	717.35		2,200 gpd/ac	1,578,170
Industrial	185.47		3,300 gpd/ac	612,051
Civic and Institutional	1,064.81		2,200 gpd/ac	2,342,582
Parks and Open Space	3,824.14		0 gpd/ac	-
Mixed Use	59.68	731	2,200 gpd/ac	343,286
Roads	3,441.07		0 gpd/ac	-
Total	**21,510.68**			**27,936,893**

The land use summary from the 2011 General Plan, utilizing the EMWD water unit demand criteria from the 2016 WFMP, would result in a 2035 total water demand of 28.19 million gallons per day. These 2011 GPU estimated demands are shown in Table 3.

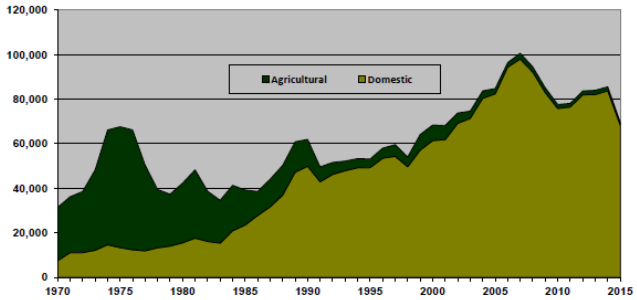
Table 3. Project Water Demands Based on the Adopted 2011 General Plan 2035 Buildout

Land Use Designation	GP Acreage	GP Dwelling Units	Unit Demand	Existing Water Demand (gpd)
Large Lot Residential	3,030.62	939	660 gpd/DU	620,065
Single-Family Residential	6,255.31	30,338	440 gpd/DU	13,348,832
Multiple-Family Residential	661.56	12,318	290 gpd/DU	3,572,292
Innovation	0		2,200 gpd/ac	-
Commercial	1,266.58	4	2,200 gpd/ac	2,787,636
Office and Research Park	1,353.70	20	2,200 gpd/ac	2,983,940
Business Park	717.35		2,200 gpd/ac	1,578,170
Industrial	185.47		3,300 gpd/ac	612,051
Civic and Institutional	1,064.88		2,200 gpd/ac	2,342,736
Parks and Open Space	3,474.46		0 gpd/ac	-
Mixed Use	59.68	731	2,200 gpd/ac	343,286
Roads	3,441.07		0 gpd/ac	-
Total	**21,510.68**			**28,189,007**

The proposed decrease in water demands from the 2011 General Plan is approximately one percent, under the proposed GPU and based on unit water demand criteria from the 2016 EMWD WFMP.

Overall, EMWD continues to see a decline in overall water usage as many agricultural areas transition to development. Figure 5 below from the 2015 UWMP illustrates this trend, where usage the past few years is 30 percent below the peak year usage in the past. As a result, EMWD continues to maintain sufficient infrastructure to supply current and planned land uses.

Figure 5. Retail Potable Water Sales (1970-2015)



Source: EMWD 2015 UWMP, Table 4-1

6. Potential Annexation Area Analysis

The General Plan Update includes potential increased development in portions of the City that would be a candidate for future annexation into EMWD for public utility services should those areas develop in the future. Figure 1 depicts the Potential EMWD Annex Area which primarily consists of existing rural residential homes at lower densities and undeveloped lands. Water is provided by private wells and sewer serviced through onsite septic systems. If this area develops and potentially densifies, a portion of or the entirety of the area may be considered for annexation into EMWD. Other drivers for annexation could include lowered groundwater tables, which would affect private well production.

Referring to the Potential EMWD Annex Area in Figure 1, this area within a municipality is commonly referred to as an island area. Riverside County LAFCO encourages municipal and agency collaboration to facilitate these type of annexations to provide more efficient and reliable service. This process is referred to as a re-organization and can be a stream-lined process when all the affected agencies, including EMWD and MWD, and the City support the annexation.

Future annexation proceedings would be initiated through EMWD. EMWD is a member agency within MWD's service boundary, so in addition to a future EMWD annexation, the area is also not part of the MWD current service area and would therefore have to also be annexed into MWD water service area. Each agency will require payment of fees which may include annexation fees, capacity fees, and other administrative costs. MWD also encourages annexations of these island areas and prefers that the areas be included/annexed as part of one proceeding.

EMWD has developed the following procedures and processes for areas that request annexation into their service area, including the following required documentation:

- Plan for Implementing Water Efficiency Measures
- Plan of Service
- LAFCO Application
- Maps and Legal Description (per MWD and LAFCO requirements)

6.1 Potential EMWD Annex Area Water Demand Analysis

Table 4 below summarizes the potential water demands for the Potential EMWD Annex Area, as shown on Figure 1 and Figure 6, based on land uses under the 2011 General Plan and the proposed General Plan Update.

Figure 6. Potential EMWD Annex Area

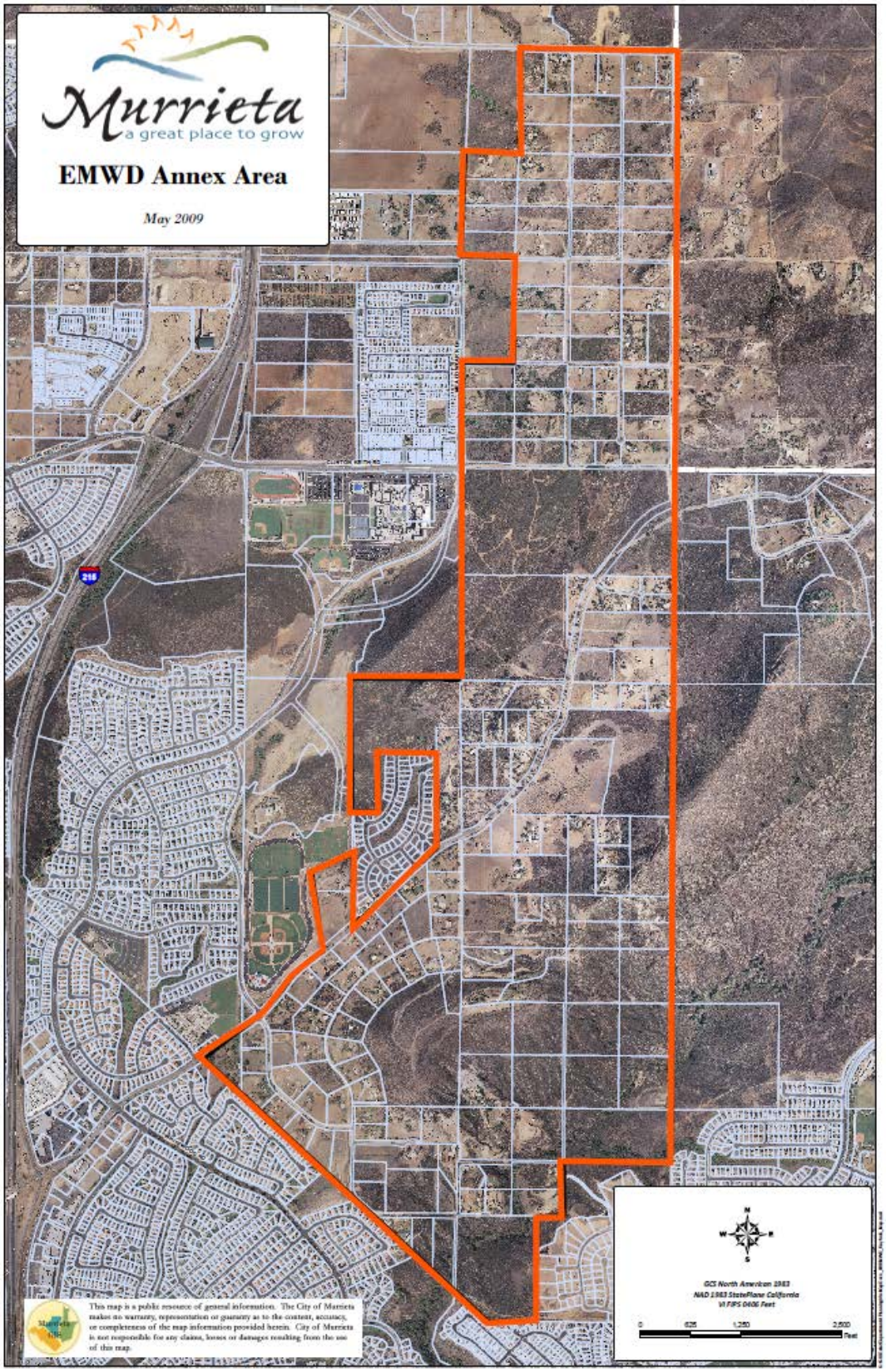


Table 4. Annexation Area Water Demands

Land Use	Existing Acreage	Existing Dwelling Units	Proposed Acreage	Proposed Dwelling Units	Unit Demand	Existing Water Demand (gpd)	Potential Water Demand (gpd)
Large Lot Residential	680.05	211	576.87	179	660 gpd/DU	139,138	118,027
Single Family Residential	0.00	0.00	169.48	822	440 gpd/DU	-	361,670
Multiple Family Residential	0.00	0.00	53.47	996	290 gpd/DU	-	288,710
Innovation	0.00		57.96		2,200 gpd/ac	-	127,506
Commercial	0.00		0.00		2,200 gpd/ac	-	-
Office and Research Park	252.28		0.00		2,200 gpd/ac	555,012	-
Business Park	0.00		0.00		2,200 gpd/ac	-	-
Industrial	0.00		0.00		3,300 gpd/ac	-	-
Civic and Institutional	0.00		0.00		2,200 gpd/ac	-	-
Parks and Open Space	120.95		195.50		0 gpd/ac	-	-
Mixed Use	0.00		0.00		2,200 gpd/ac	-	-
Roads	58.84		58.84		0 gpd/ac	-	-
Total	**1,112.12**		**1,112.12**			**694,150**	**895,912**

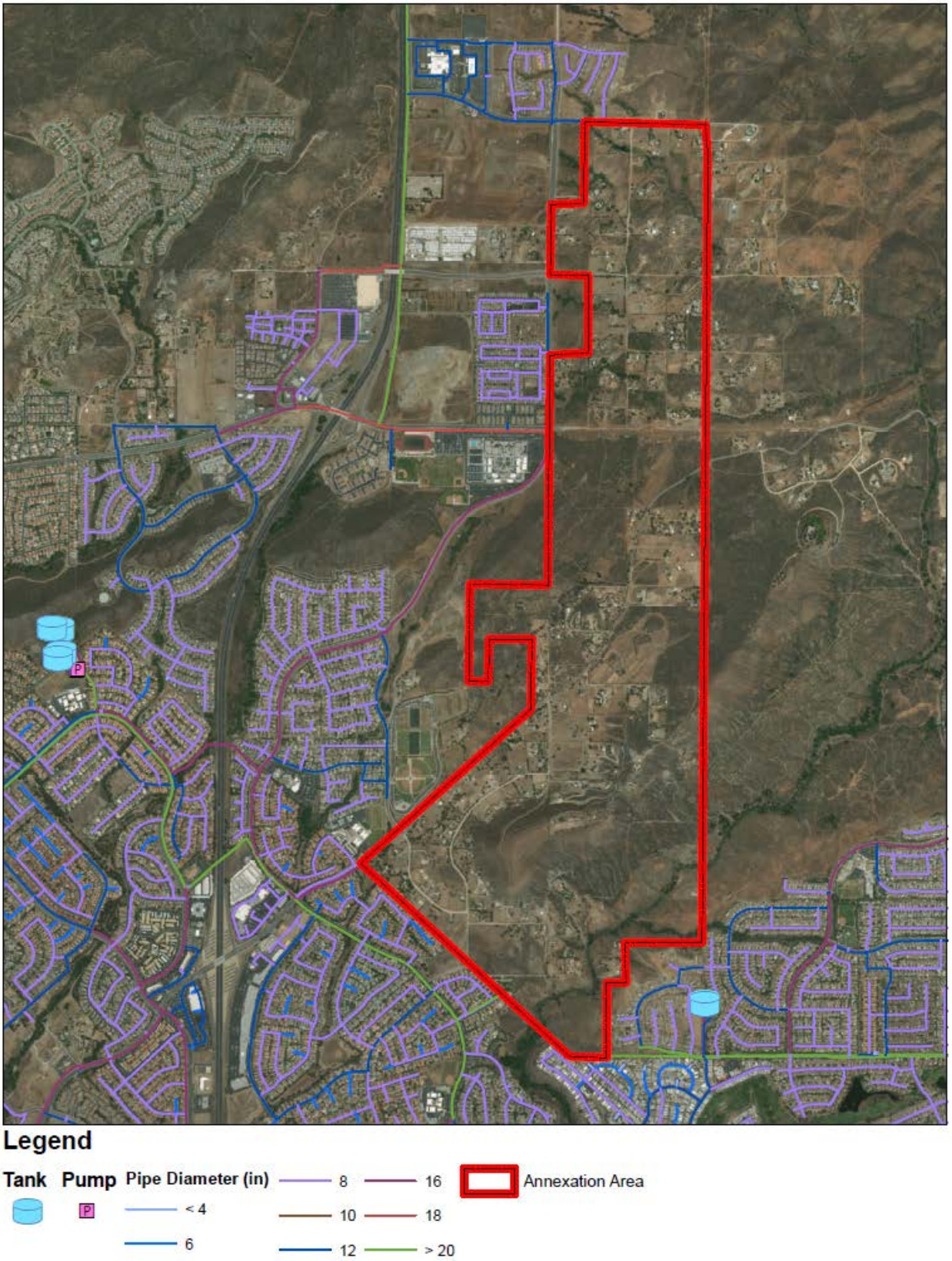
Based on increased Single Family Residential and Multi-Family Residential uses and the reallocation of Office/Research Park uses, the GPU land use changes within the Potential EMWD Annex Area create an increased water demand of approximately 0.2 million gallons per day. However, this area is currently served potable water from groundwater wells and does not rely on agency water facilities. The Potential EMWD Annex Area demand as a whole may be considered an additional demand on the EMWD supply and distribution facilities. Should this area annex into EMWD's service area, EMWD may request that the development utilize conservation measures in its planning efforts to offset the increased water demand, in the event that the area is not captured in the next 2020 UWMP forecast. On the other hand, the City-wide GPU proposed land use changes result in a decrease in water use, which may be considered as part of the annexation and technical evaluation.

6.2 Facilities Assessment

The Potential EMWD Annex Area is within the EMWD Temecula Valley Service Area and is adjacent to the Murrieta Hot Springs, Las Brisas, and Dutch Village Pressure Zones. Existing potable water lines in the area range from 4 to 20 inches in diameter, as shown in Figure 7. Existing storage and pumping facilities were all found to be adequate in the 2016 WFMP and no fire flow service deficiencies were noted.

Should the Potential EMWD Annex Area develop beyond existing rural densities, a development plan and water system analysis may be requested by EMWD to determine the necessary infrastructure and improvements that may be required to adequately serve the area and/or development project.

Figure 7. Existing EMWD Potable Water Facilities



6.3 Annexation Process Overview

The following highlights the major agency reviews and resolutions necessary and includes approximate timelines for annexation:

6.3.1 EMWD Staff Reviews

EMWD conducts a review of the Project CEQA documents and files an Environmental Document with the County of Riverside:

- MWD's Plan for Implementing Water Use Efficiency Guidelines
- LAFCO's Plan of Service
- Timeline: 2 to 3 months

6.3.2 EMWD Board Meeting (Public Hearing)

EMWD will hold a Board meeting to adopt a resolution making an application to LAFCO, including ordering the annexation. At the Board meeting EMWD will adopt a resolution requesting MWD's Formal Approval of the annexation. Processing fees will be required as part of submitting for approval from MWD. The following documents are required for the Board resolution:

- MWD's Plan for Implementing Water Use Efficiency Guidelines
- LAFCO's Plan of Service
- Certificate of Assessed Value
- Maps and Legal Description
- Timeline: 2 to 3 months

6.3.3 MWD Board Meeting (Public Hearing)

MWD will hold a Board meeting to adopt a resolution of intent making an application for annexation. The Board approves terms and conditions and adopts resolution of intent to impose standby charges and sends the approved map and legal description to LAFCO for approval. The following documents are required for the MWD Board resolution:

- CEQA Documents
- EMWD's Resolution Requesting MWD's Formal Approval
- Timeline: 2 to 3 months

6.3.4 LAFCO Public Hearing

LAFCO conducts a hearing and adopts a Resolution ordering the annexation based on the following submittals:

- LAFCO Application and Processing Fee
- Environmental Documents
- Plan of Service
- Map and Legal Description (signed by MWD)
- EMWD's Resolution Making Application to LAFCO
- MWD's Plan for Implementing Water Use Efficiency Guidelines
- MWD's Resolution
- Petition
- Assessor's Data
- Timeline: 5 to 6 months

6.3.5 Final EMWD Board Meeting

The final EMWD Board meeting is held to adopt a Resolution approving/finalizing MWD's terms and conditions regarding the annexation. The approximate timeline for this step is 2 months.

Following the final EMWD Board meeting, EMWD will request MWD and State Board of Equalization (SBE) fees from the Property Owner/Subagency. Upon receipt of the fees, EMWD then submits to MWD a MWD acreage charge, a copy of EMWD's Resolution approving the formal terms and conditions, and LAFCO's Resolution ordering the annexation. To LAFCO, EMWD submit the SBE fee and a clearance letter to record the annexation.

LAFCO proceed to record the annexation and issues a Certificate of Completion to EMWD. EMWD submits a copy of the Certificate of Completion to MWD and then updates maps to include the annexation area within its service boundaries.

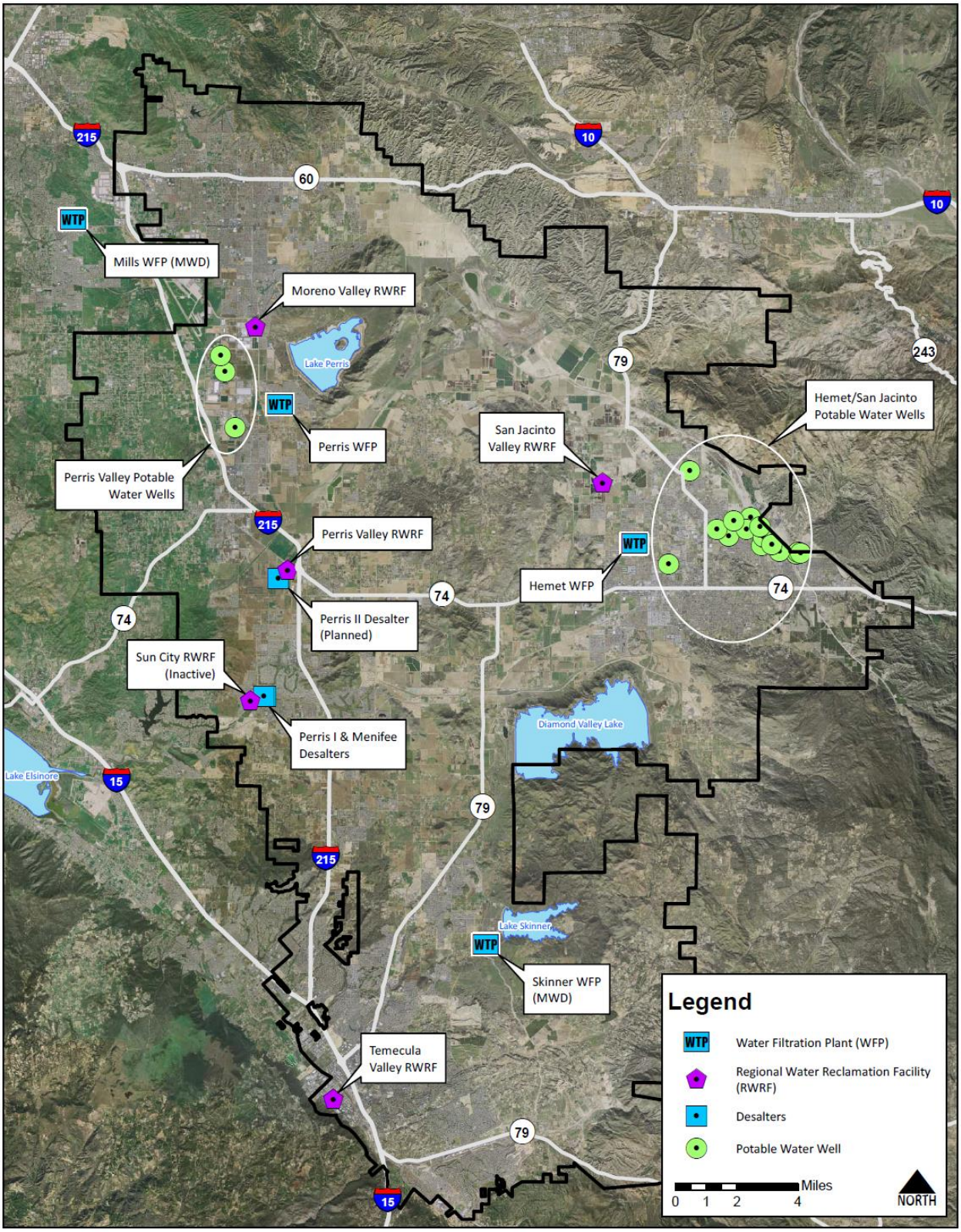
7. Summary of Conclusions

The proposed General Plan Update land use changes do not create an increase in proposed water demands in the City of Murrieta and should not have any impact on existing or proposed EMWD facilities in the Temecula Valley service area. It is recommended that upon adoption of the GPU, the land use information be provided to EMWD for inclusion in the EMWD 2020 UWMP Update, which would then able to document the planned land use changes when submitted, as well as identify potential future EMWD annexation areas in the City.

Appendix A

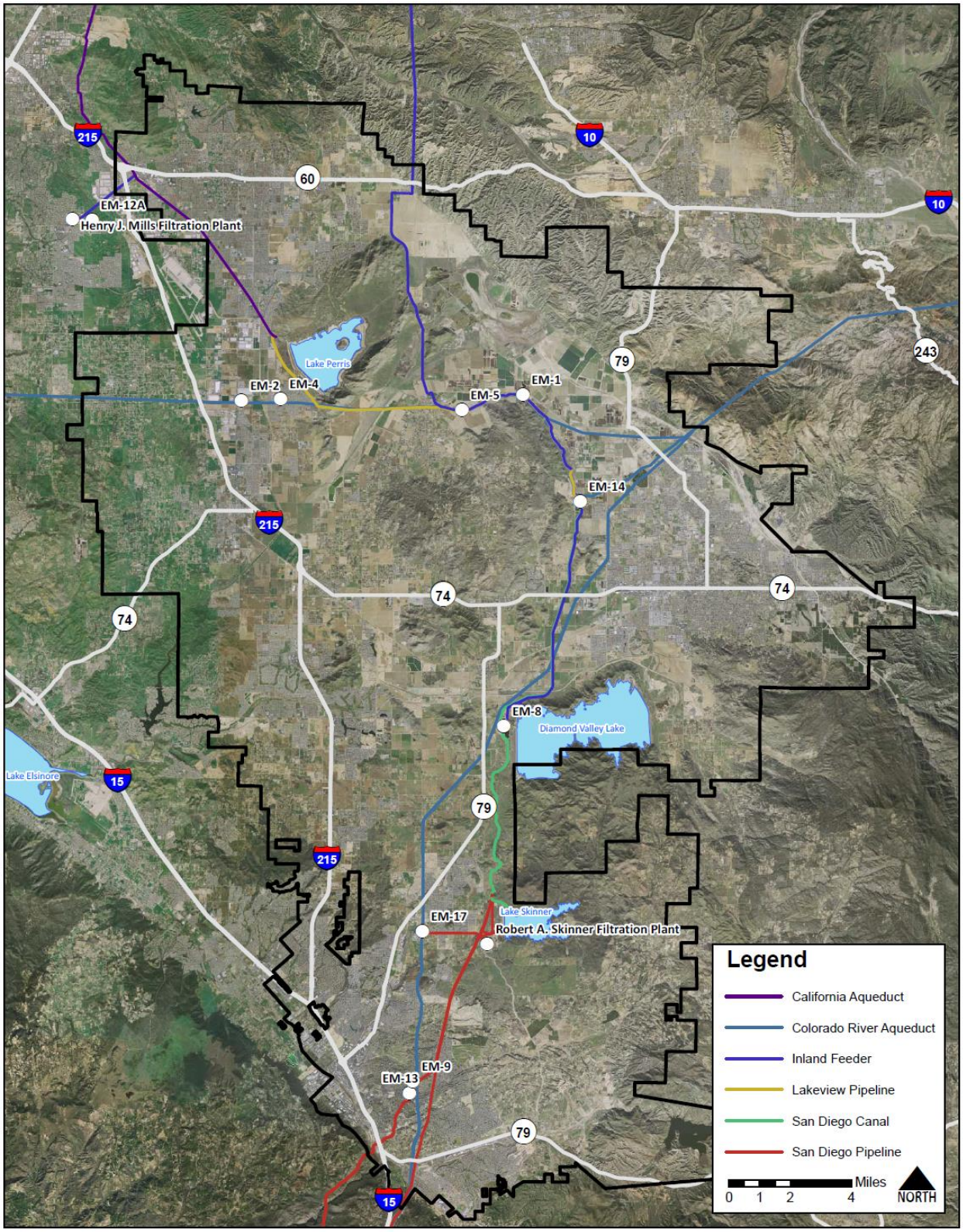
Reference Figures from EMWD 2015 UWMP

Figure 3-2: Location of Treatment and Distribution Facilities in EMWD's Service Area



Eastern Municipal Water District
Key Facilities

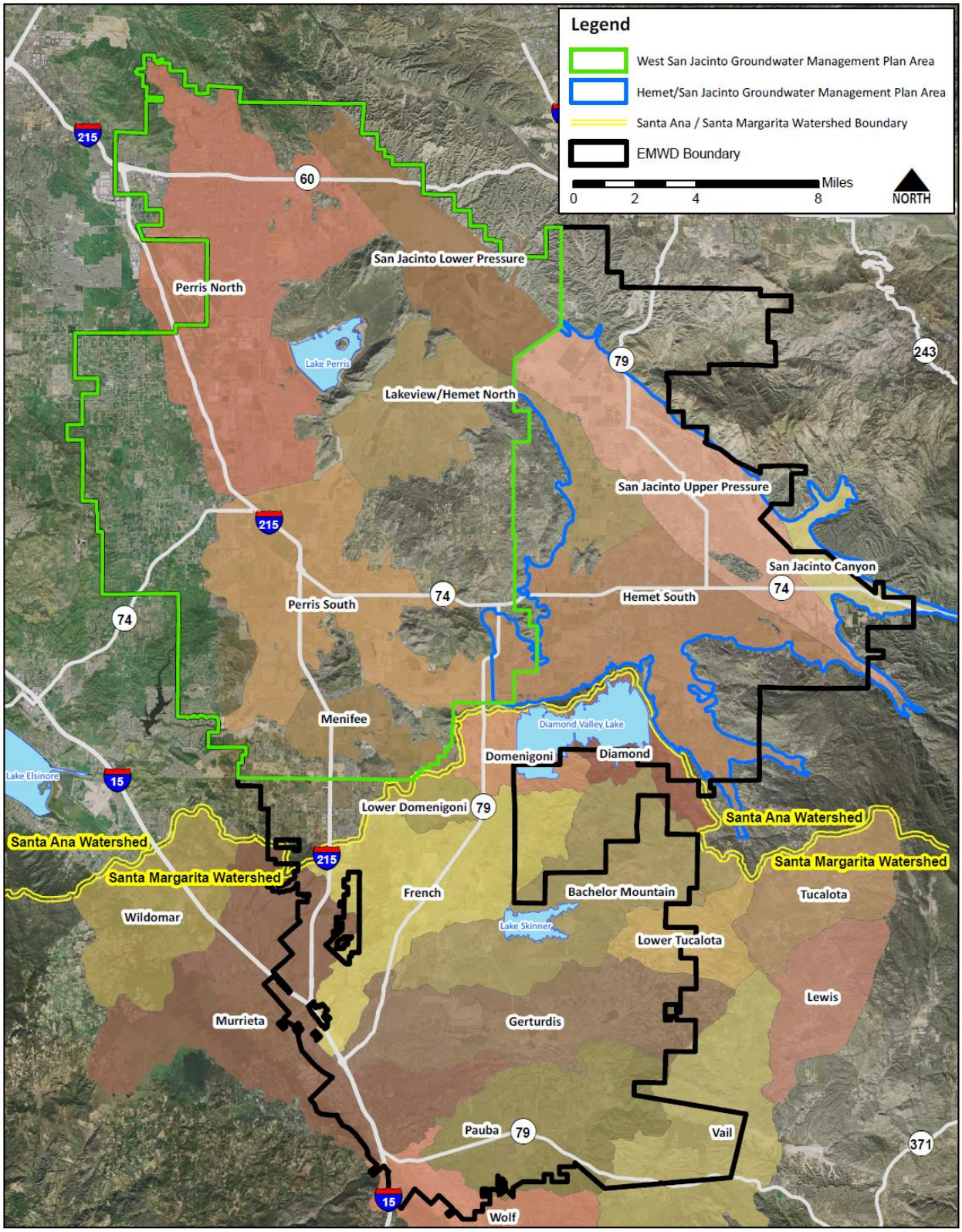
Figure 6-3: MWD Facilities within EMWD's Service Area



emwd

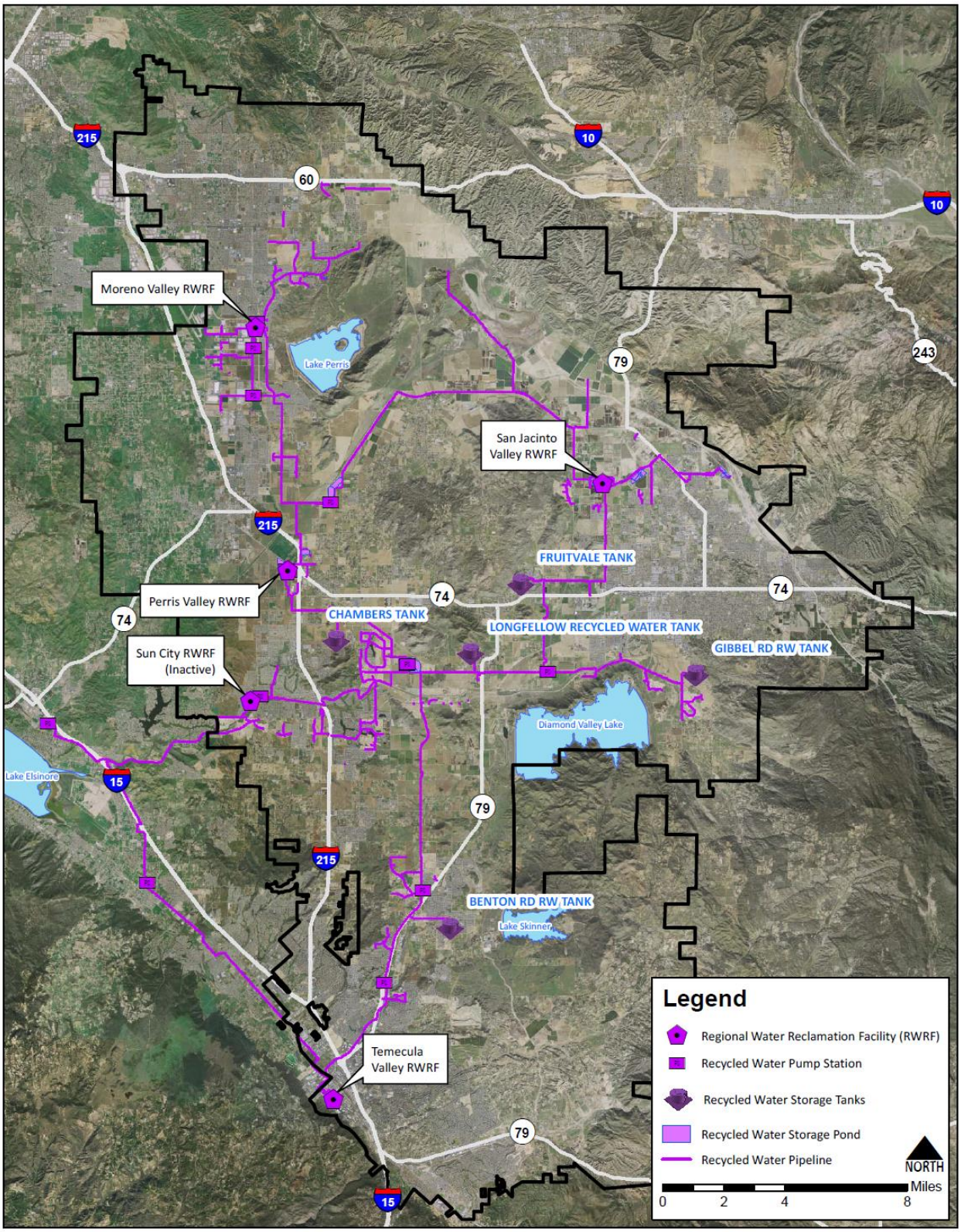
Eastern Municipal Water District
Metropolitan Water District Facilities

Figure 6-4: Groundwater Management Zones



Eastern Municipal Water District
Groundwater Management Zones

Figure 6-5: Key Recycled Water Facilities



emwd

Eastern Municipal Water District
Key Facilities - Recycled Water

APPENDIX E
TRAFFIC IMPACT ANALYSIS

City of Murrieta Focused General Plan Update
Traffic Impact Analysis

April 1, 2019

November 19, 2019

Submitted to:

Murrieta
the future of southern california

10173.19 | Prepared by **Iteris, Inc.**

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1 INTRODUCTION

This report summarizes the results of the Traffic Impact Analysis (TIA) for the City of Murrieta Focused General Plan Update (GPU). This report provides detailed information concerning the methodology, findings and conclusions of the traffic analysis. The traffic analysis evaluates existing and future year traffic conditions at key intersections and roadways, taking into account growth in traffic due to buildout of the currently adopted General Plan and the modifications resulting from this Focused General Plan Update.

1.1 Project Description

The Focused GPU supersedes the 2011 Murrieta General Plan and subsequent General Plan Amendments through 2018. As this is a focused update, many portions of the 2011 General Plan will remain unchanged. This section summarizes the major changes between the 2011 General Plan and the Focused GPU.

The General Plan Land Use Policy Map identifies the type, location, and density/intensity of future development within the City of Murrieta. There are two key differences between the 2011 General Plan Land Use Policy Map and the proposed General Plan Land Use Policy Map which are found within six key areas. The first difference is that the Focused GPU contains a new land use designation, Innovation. The second difference is the mix and location of land use designations within the six key areas.

The new land use designation, Innovation, is defined as follows:

- **Innovation** - The Innovation designation provides for a wider variety and intensity of non-residential uses allowed elsewhere in the City with the goal of providing a cutting edge and campus-like mixed-use business setting. The Innovation designation provides for employment intensive uses such as business and medical offices, corporate headquarters, medical services, research and development, education, technological advancement, makers labs (such as people using digital tools to design new products), craftsman products (such as furniture and window design/construction), and hotels. It will also provide for a limited amount of commercial uses for the sale of products made in facilities on-site and restaurants that support the employment and primary uses.

A summary of the change in the mix and location of land use designations within the six key areas is described in **Table 1**.

Table 1: Project Description Per Planning Area

Planning Area	Location	Existing Land Use Designation (2011 GP)	Proposed Land Use Designation
1	Bordered by Elm St to the south, Madison Ave to the west, Guava St to the north, and I-15 to the east	Office Research Park	Innovation
2	Bordered by a residential subdivision to the north, the City's boundary with the City of Temecula to the south, I-15 to the west, and residential subdivisions, open space areas and a creek to the east	Office Research Park, Commercial, Single-family Residential, Multi-family Residential	Innovation, Parks/Open Space, Commercial, Multi-family Residential
3	Bordered by Murrieta Hot Springs Road to the south, Sparkman Drive to the west, Medical Center Drive to the north, and Hancock Avenue to the east.	Office Research Park and Civic and Institutional	Commercial

Planning Area	Location	Existing Land Use Designation (2011 GP)	Proposed Land Use Designation
4	Bordered by Whitewood Road and I-215 to the west, Baxter Road to the north, Menifee Road to the east, and Los Alamos Road to the southeast.	Office Research Park, Large Lot Residential	Innovation, Single-family Residential, Multi-family Residential, Parks/Open Space
5	Bordered by the City's boundary with the County of Riverside to the north, Open Space areas to the west, I-215 to the east, and Linnel Lane to the south	Office Research Park	Innovation, Single-family Residential, Multi-family Residential
6	Bordered by Big Dipper Way, Via Mira Mosa, and Ariel Street to the south, Maximillian Avenue to the east, Donald Road to the north, and open space areas to the west.	Single-family Residential	Parks/Open Space

The locations of the six planning areas are shown in **Figure 1-1**.

1.2 Study Area

The study area for analysis includes the following twenty-three (23) intersections within the City or sphere of influence:

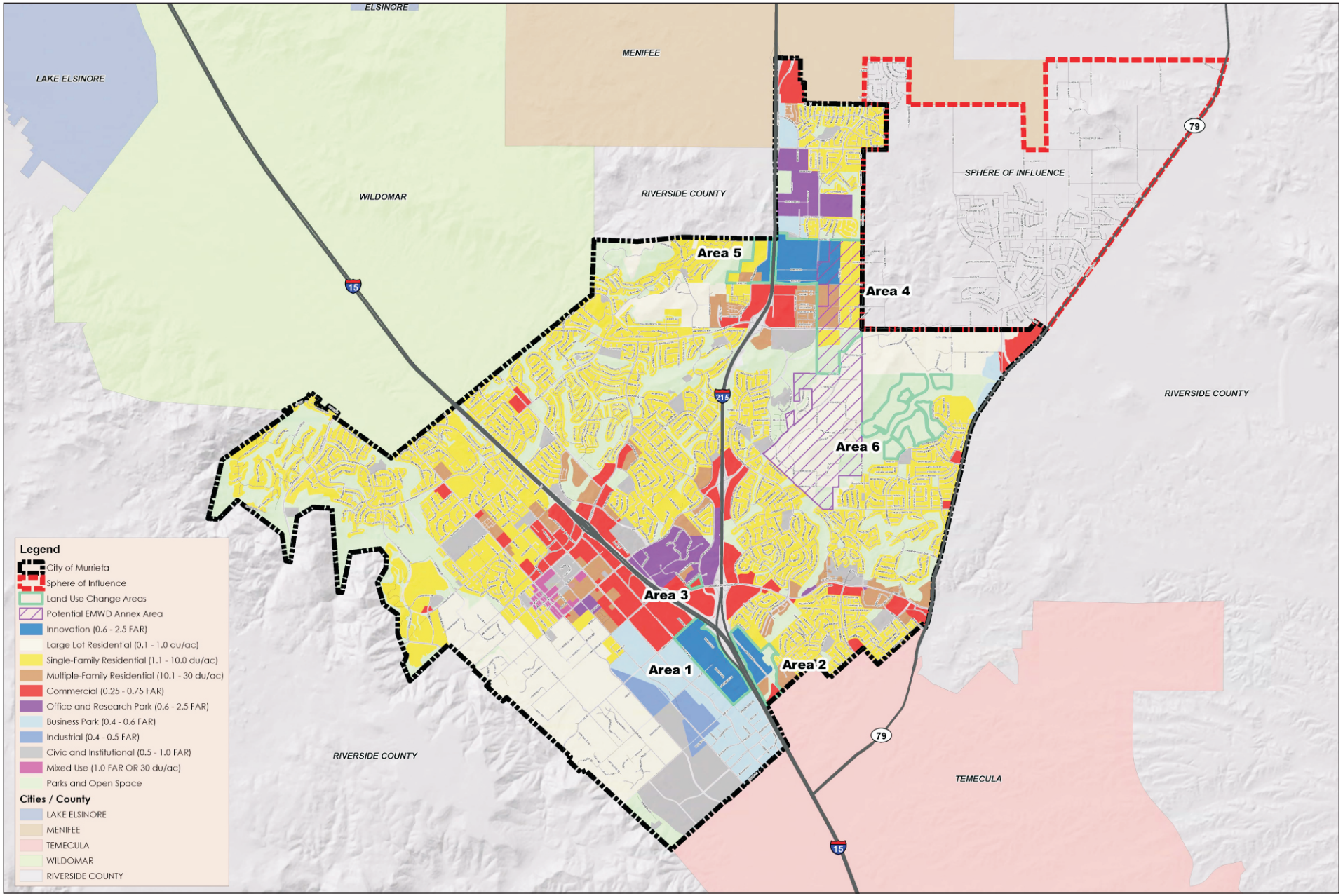
1. Jefferson Avenue/Murrieta Hot Springs Road;
2. Madison Avenue/Murrieta Hot Springs Road;
3. Menifee Road/Scott Road (sphere of influence);
4. Winchester Road (SR-79)/Scott Road (sphere of influence);
5. Antelope Road/Keller Road (renamed Warm Springs Parkway/Keller Road in future conditions);
6. Antelope Road/Baxter Road (renamed Warm Springs Parkway/Baxter Road in future conditions);
7. California Oaks Road/Clinton Keith Road;
8. Jefferson Avenue/Kalmia Street;
9. Winchester Road (SR-79)/Murrieta Hot Springs Road;
10. Hancock Avenue/Los Alamos Road;
11. I-215 Southbound Ramps/Los Alamos Road;
12. Whitewood Road/Murrieta Hot Springs Road;
13. Nutmeg Street/Clinton Keith Road;
14. Leon Road/Scott Road (sphere of influence);
15. Mitchell Road/Clinton Keith Road;
16. I-215 Northbound Ramps/Clinton Keith Road;
17. Whitewood Road/Clinton Keith Road;
18. Jefferson Avenue/Los Alamos Road;
19. Whitewood Road/Linnel Lane;
20. Whitewood Road/Baxter Road;
21. Warm Springs Parkway/Linnel Lane (future intersection);
22. Briggs Road/Keller Road (future intersection, sphere of influence); and
23. Winchester Road (SR-79)/Clinton Keith Road-Benton Road (future intersection).

Figure 1-2 shows the locations of the study intersections. Note that three of the locations are future intersections. The intersections represent key locations in the vicinity of the land use change areas, where major arterials intersect,

and where land use trip distribution is anticipated.

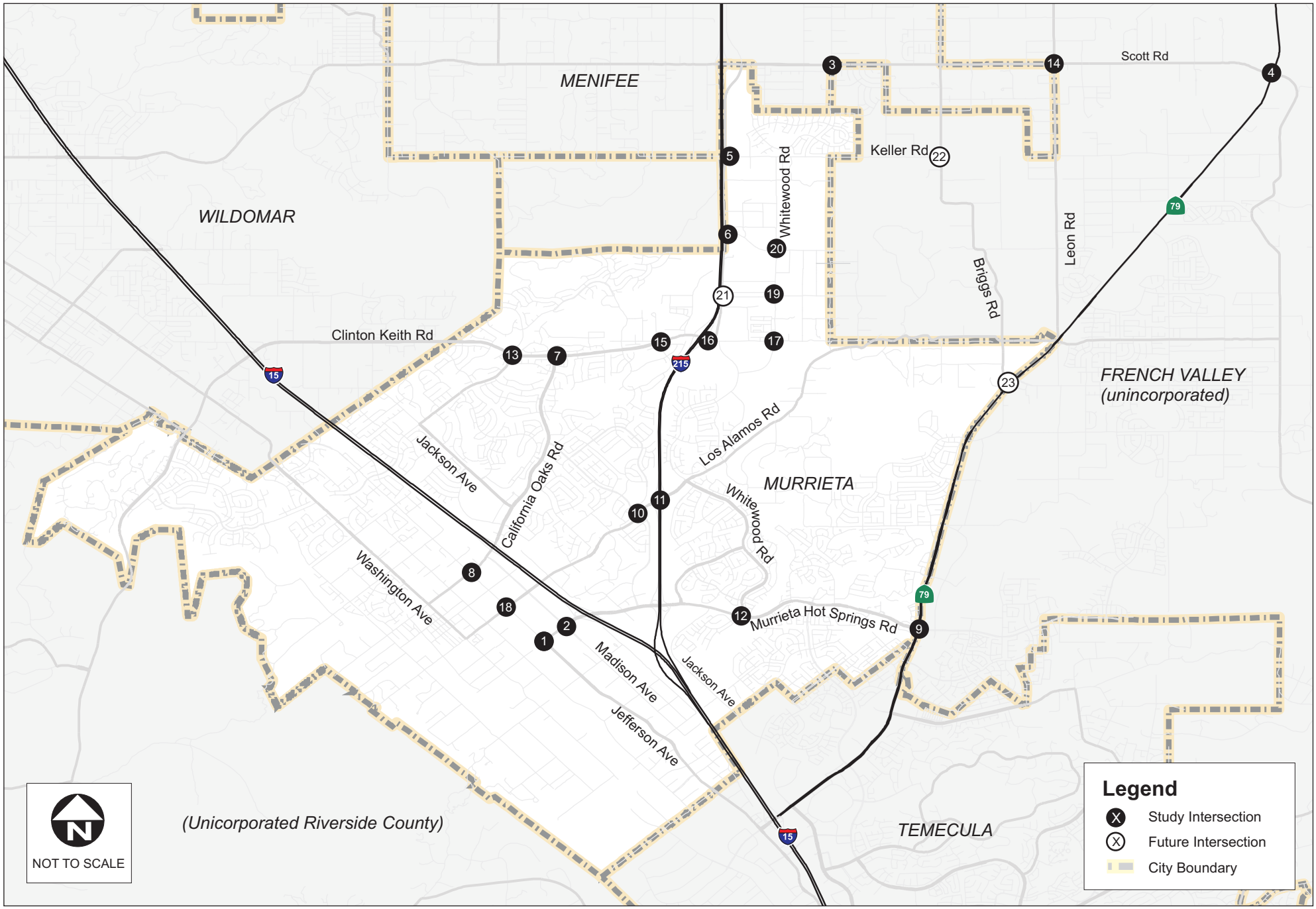
In addition, the study area for analysis includes the following twenty-two (22) roadway segments within the City or sphere of influence:

1. Scott Road east of Menifee Road;
2. Scott Road between Leon Road and Winchester Road (SR-79);
3. Keller Road between I-215 and Whitewood Road;
4. Keller Road east of Whitewood Road (future conditions only);
5. Baxter Road between Antelope Road and Whitewood Road;
6. Antelope Road between Baxter Road and Clinton Keith Road;
7. Whitewood Road between Baxter Road and Clinton Keith Road;
8. Clinton Keith Road west of Nutmeg Street;
9. Clinton Keith Road east of California Oaks Road;
10. Clinton Keith Road between I-215 and Whitewood Road;
11. Clinton Keith Road east of Whitewood Road;
12. California Oaks Road south of Clinton Keith Road;
13. California Oaks Road south of I-15;
14. Jefferson Avenue south of California Oaks Road;
15. Los Alamos Road between I-215 and Whitewood Road;
16. Los Alamos Road between Monroe Avenue and Hancock Avenue;
17. Whitewood Road north of Murrieta Hot Springs Road;
18. Jefferson Avenue south of Murrieta Hot Springs Road;
19. Murrieta Hot Springs Road between I-15 and I-215;
20. Murrieta Hot Springs Road between Alta Murrieta Drive and Whitewood Road;
21. Murrieta Hot Springs Road between Whitewood Road and Margarita Road; and
22. Murrieta Hot Springs Road between Margarita Road and Winchester Road (SR-79).



Source: Rick Engineering

Figure 1-1
General Plan Land Use Planning Areas



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Focused General Plan Update
Traffic Impact Analysis

Figure 1-2
Study Intersections

1.3 Study Periods

Traffic operations were evaluated for each of the following scenarios during the weekday a.m. (7:00 – 9:00) and p.m. (4:00 – 6:00) peak hours during typical weekday conditions (during the school year):

- Existing Conditions;
- Future Year 2035 Without Project Conditions (with currently adopted General Plan); and
- Future Year 2035 With Project Conditions (with Focused General Plan Update).

2 ENVIRONMENTAL SETTING

This section describes the current environmental setting of the study area, including descriptions of key roadways and the methodology for existing traffic volume collection.

2.1 Roadway Configurations

Below are descriptions of the existing characteristics of key roadways in the study area:

- *Keller Road*, oriented in an east-west direction, is a two- to three-lane undivided roadway within the City of Murrieta. As part of the Circulation Element, Keller Road is planned to provide access to I-215 via a future interchange. The posted speed limit is 40 mph.
- *Clinton Keith Road*, oriented in an east-west direction, is generally a four-lane roadway west of I-215, providing access to both I-15 and I-215 via interchanges. East of I-215, Clinton Keith Road is a six-lane divided roadway that currently terminates at Leon Road. The posted speed limit is 50 mph west of I-215 and 45 mph east of I-215.
- *California Oaks Road*, oriented in a northeast-southwest direction, is a four-lane divided roadway providing access to I-15. California Oaks Road terminates on the north at Clinton Keith Road. The posted speed limit is 40 mph west of Jackson Avenue and 45 mph east of Jackson Avenue.
- *Los Alamos Road*, oriented in a northeast-southwest direction, is a four lane divided roadway providing access to I-215. The posted speed limit is 45 mph. West of Jefferson Avenue, Los Alamos Road transitions to a two-lane roadway with the name changing to Ivy Street.
- *Murrieta Hot Springs Road*, oriented in an east-west direction, is generally a six-lane divided roadway providing access to both I-15 and I-215 via interchanges. West of I-15, Murrieta Hot Springs Road terminates at Jefferson Avenue. The posted speed limit is 45 mph.
- *Jefferson Avenue*, oriented in a northwest-southeast direction, is generally a four-lane divided roadway (two-lane sections exist) running parallel to I-15. Jefferson Avenue terminates on the north end at Grizzly Ridge Drive. The posted speed limit varies between 40, 45, and 50 mph.
- *Whitewood Road*, oriented in a north-south direction, is a four-lane divided roadway running parallel to I-215. Whitewood Road terminates on the south within a residential area south of Murrieta Hot Springs Road. The posted speed limit is 45 mph.

2.2 Existing Traffic Volumes

Existing traffic counts at the study intersections were conducted in December 2018. All counts were conducted during the a.m. peak period (7:00 – 9:00) and p.m. peak period (4:00 – 6:00). The traffic impact analysis is based on the highest single hour of traffic during each time period at each location. Traffic counts were collected while schools were still in session, avoiding any holiday-related shifts in traffic patterns. Average Daily Traffic (ADT) volumes at the roadway segments were calculated based on peak hour adjacent intersection approach and departure volumes, using a peak hour-to-daily volume ratio (i.e., K factor) developed from daily volume counts at other locations provided by the City. Detailed vehicle turning movement data is included in **Appendix A**. and **Figure 2-1** shows the existing peak hour volumes at the study intersections.

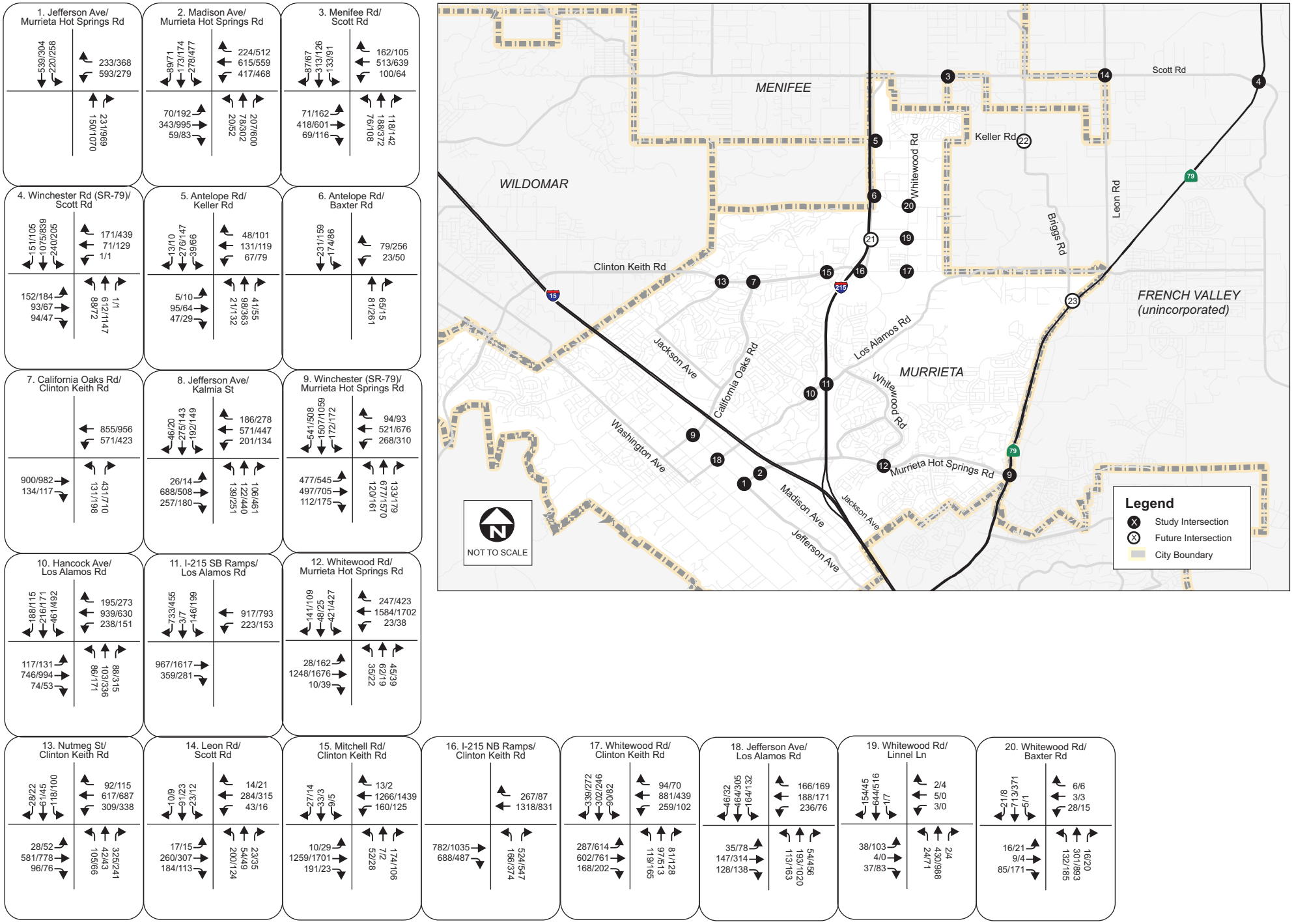

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Figure 2-1
Existing Intersection Volumes

3 TRAFFIC OPERATIONS ANALYSIS METHODOLOGY

The quality of traffic operations is characterized using the concept of level of service (LOS). Level of service is defined by a range of grades from A (best) to F (worst). At intersections, LOS "A" represents relatively free flow operating conditions with little or no delay. LOS "F" is characterized by extremely unstable flow conditions, severe congestion and delays with traffic volumes at or near the intersection's design capacity. This typically results in long vehicular queues extending from all approaches to the intersection.

Analysis of traffic operations were conducted using the Highway Capacity Manual (HCM) 2010 Edition. LOS analysis was calculated at the study area intersections using Synchro 9 software. All traffic signal phasing splits were optimized for the purposes of this analysis. **Table 2** presents a brief description of each level of service letter grade, as well as the range of HCM average intersection delay associated with each grade for both signalized and unsignalized intersections.

Table 2: Intersection Level of Service Definitions

Level Of Service	Description	Signalized Intersection Delay (seconds per vehicle)	Unsignalized Intersection Delay (seconds per vehicle)
A	Excellent operation. All approaches to the intersection appear quite open, turning movements are easily made, and nearly all drivers find freedom of operation.	≤ 10	≤ 10
B	Very good operation. Many drivers begin to feel somewhat restricted within platoons of vehicles. This represents stable flow. An approach to an intersection may occasionally be fully utilized and traffic queues start to form.	>10 and ≤ 20	>10 and ≤ 15
C	Good operation. Occasionally drivers may have to wait more than 60 seconds, and back-ups may develop behind turning vehicles. Most drivers feel somewhat restricted.	>20 and ≤ 35	>15 and ≤ 25
D	Fair operation. Cars are sometimes required to wait more than 60 seconds during short peaks. There are no long-standing traffic queues.	>35 and ≤ 55	>25 and ≤ 35
E	Poor operation. Some long-standing vehicular queues develop on critical approaches to intersections. Delays may be up to several minutes.	>55 and ≤ 80	>35 and ≤ 50
F	Forced flow. Represents jammed conditions. Backups form locations downstream or on the cross street may restrict or prevent movement of vehicles out of the intersection approach lanes; therefore, volumes carried are not predictable. Potential for stop and go type traffic flow.	> 80	> 50

The City's Level of Service standard, as published in the City's current General Plan, Chapter IV, is LOS D for peak hour intersection operations.

Table 3 presents the daily roadway capacity values per the current Circulation Element, for use in the roadway segment LOS analysis.

Table 3: Daily Roadway Capacity

Facility	Lane Configuration	Maximum Capacity (veh/day)
Collector	2-lane Divided	13,000
Secondary	4-lane Divided	25,900
Major	4-lane Divided	34,100
Arterial	4-lane Divided	35,900
Arterial and Urban Arterial	6-lane Divided	53,900
Augmented Urban Arterial	8-lane Divided	71,800

Table 4 summarizes the LOS criteria, measured in terms of Volume-to-Capacity ratio, for use in the roadway segment analysis.

Table 4: Roadway Segment Level of Service Criteria

Level of Service (LOS)	Volume-to-Capacity Ratio
A	0.00 – 0.60
B	> 0.60 – 0.70
C	> 0.70 – 0.80
D	> 0.80 – 0.90
E	> 0.90 – 1.00
F	> 1.00

The City's Level of Service standard is LOS C for roadway segment operations, unless segments are within General Plan Focus Areas where LOS D is allowed.

3.1 Significance Criteria

This section presents the significant impact criteria at roadway segments and intersections.

3.1.1 Roadway Segments

Traffic volume increases from public or private projects that result in the following criteria will have a significant traffic volume or level of service traffic impact on a roadway segment:

- The additional or redistributed ADT generated by the proposed project will significantly increase congestion on a roadway segment currently operating at LOS E or F, or will cause a roadway segment to operate at LOS E or LOS F as a result of the proposed project as identified in **Table 5**.

Table 5: Measures of Significant Project Impacts to Congestion on Roadway Segments

Level of Service	Allowable Increases on Congested Roadway Segments		
	Two-lane Road	Four-lane Road	Six-lane Road
LOS E	200 ADT	400 ADT	600 ADT
LOS F	100 ADT	200 ADT	300 ADT

Notes:
1. By adding proposed project trips to all other trips from a list of projects, this same table must be used to determine if total cumulative impacts are significant. If cumulative impacts are found to be significant, each project that contributes additional trips must mitigate a share of the cumulative impacts.
2. The City may also determine impacts have occurred on roads even where a project's traffic or cumulative impacts do not trigger an unacceptable level of service, when such traffic uses a significant amount of remaining roadway capacity.

3.1.2 Intersections

This section provides guidance for evaluating adverse environmental effects a project may have on signalized and unsignalized intersections. **Table 6** summarizes the significant project impacts for signalized and unsignalized intersections.

Signalized

Traffic volume increases from public or private projects that result in the following criteria will have a significant traffic volume or level of service traffic impact on a signalized intersection:

- The additional or redistributed ADT generated by the proposed project will significantly increase congestion on a signalized intersection operating at LOS E or LOS F, or will cause a signalized intersection to operate at LOS E or LOS F as identified in **Table 6**.

Unsignalized

Traffic volume increases from public or private projects that result in one or more of the following criteria will have a significant impact to an unsignalized intersection as listed in **Table 6** and described in text below:

- The additional or redistributed traffic generated by the proposed project will add 21 or more peak hour trips to a critical movement of an unsignalized intersection, and cause an unsignalized intersection to operate below LOS D, or
- The additional or redistributed traffic generated by the proposed project will add 21 or more peak hour trips to a critical movement of an unsignalized intersection currently operating at LOS E, or
- The additional or redistributed traffic generated by the proposed project will add 6 or more peak hour trips to a critical movement of an unsignalized intersection, and cause the unsignalized intersection to operate at LOS F, or
- The additional or redistributed traffic generated by the proposed project will add 6 or more peak hour trips to a critical movement of an unsignalized intersection currently operating at LOS F, or

- Based upon an evaluation of existing accident rates, the signal prioritization list, intersection geometrics, proximity of adjacent driveways, sight distance or other factors, the project would significantly impact the operations of the intersection.

Table 6: Measures of Significant Project Impacts to Congestion on Intersections

Level of Service	Allowable Increases on Congested Intersections	
	Signalized	Unsignalized
LOS E	Delay of 2 seconds or less	20 or less peak hour trips on a critical movement
LOS F	Either a delay of 1 second, or 5 peak hour trips or less on a critical movement	5 or less peak hour trips on a critical movement

Notes:
1. A critical movement is an intersection movement (left-turn, through movement, right-turn) that experiences excessive queues, which typically operate at LOS F. Also, if a project adds significant volume to a minor roadway approach, a gap study should be provided that details the headways between vehicles on the major roadway.
2. By adding proposed project trips to all other trips from a list of projects, these same tables are used to determine if total cumulative impacts are significant. If cumulative impacts are found to be significant, each project is responsible for mitigating its share of the cumulative impact.
3. The City may also determine impacts have occurred at intersections even when a project's direct or cumulative impacts do not trigger an unacceptable level of service, when such traffic uses a significant amount of remaining intersection capacity.
4. For determining significance at signalized intersections with LOS F conditions, the analysis must evaluate both the delay and the number of trips on a critical movement. Exceedance of either criteria results in a significant impact.

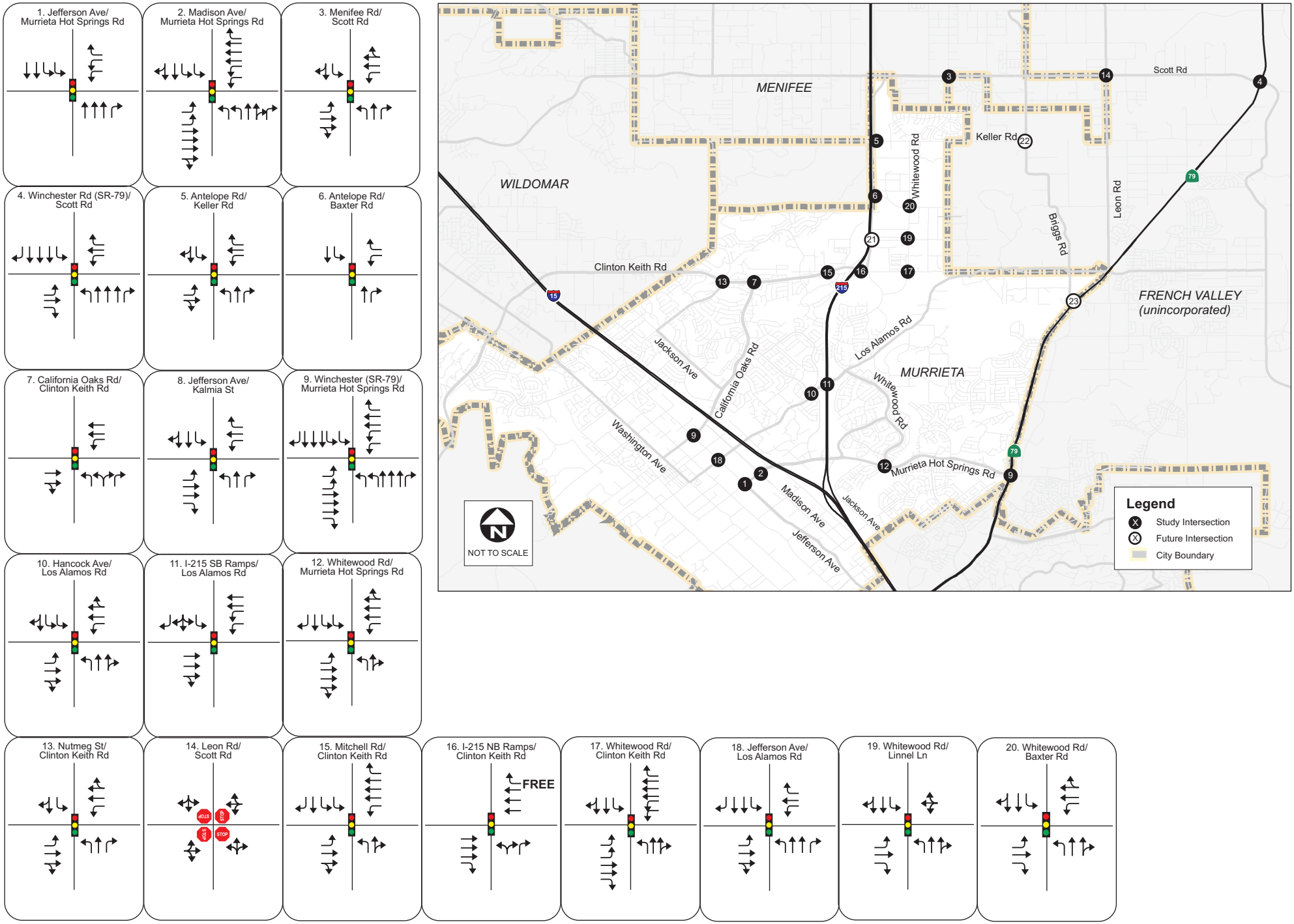
Significance criteria is adopted from the County of San Diego Guidelines for Determining Significance and Report Format and Content Requirements, Transportation and Traffic, Land Use and Environment Group, Department of Planning and Land Use, Department of Public Works, Second Modification, August 24, 2011.

4 EXISTING CONDITIONS

This section includes the analysis of existing peak hour intersection operations and daily roadway segment operations.

4.1 Intersection Analysis

A level of service analysis was conducted to evaluate existing intersection operations during the a.m. and p.m. peak hours at the study intersections. **Figure 4-1** shows the existing intersection configurations. **Table 7** summarizes the existing peak hour LOS at the study intersections. LOS calculation sheets are provided in **Appendix B**.



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Traffic Impact Analysis

Figure 4-1
Existing Intersection Lane Configurations

Table 7: Existing Intersection Peak Hour Level of Service

Intersection		Control Type	AM Peak Hour		PM Peak Hour	
			Delay (sec)	LOS	Delay (sec)	LOS
1	Jefferson Ave/Murrieta Hot Springs Rd	signalized	19.9	B	21.6	C
2	Madison Ave/Murrieta Hot Springs Rd	signalized	38.3	D	**63.8**	**E**
3	Menifee Rd/Scott Rd	signalized	29.3	C	35.8	D
4	Winchester Rd (SR-79)/Scott Rd	signalized	27.9	C	54.7	D
5	Antelope Road/Keller Rd	signalized	21.0	C	23.0	C
6	Antelope Rd/Baxter Rd	signalized	20.4	C	25.2	C
7	California Oaks Rd/Clinton Keith Rd	signalized	**60.0**	**E**	39.0	D
8	Jefferson Ave/Kalmia St	signalized	47.7	D	41.0	D
9	Winchester Rd (SR-79)/Murrieta Hot Springs Rd	signalized	44.8	D	49.5	D
10	Hancock Ave/Los Alamos Rd	signalized	**62.7**	**E**	**59.4**	**E**
11	I-215 SB Ramps/Los Alamos Rd	signalized	25.3	C	20.6	C
12	Whitewood Rd/Murrieta Hot Springs Rd	signalized	52.6	D	**72.8**	**E**
13	Nutmeg St/Clinton Keith Rd	signalized	30.3	C	36.7	D
14	Leon Rd/Scott Rd	AWSC	24.3	C	18.6	C
15	Mitchell Rd/Clinton Keith Rd	signalized	41.7	D	43.2	D
16	I-215 NB Ramps/Clinton Keith Rd	signalized	21.7	C	20.7	C
17	Whitewood Rd/Clinton Keith Rd	signalized	44.2	D	41.4	D
18	Jefferson Ave/Los Alamos Rd	signalized	33.8	C	31.3	C
19	Whitewood Rd/Linnel Ln	signalized	8.9	A	12.1	B
20	Whitewood Rd/Baxter Rd	signalized	15.6	B	16.8	B

Notes:
LOS = Level of Service.
AWSC = All-way stop control

As shown in **Table 7**, the following intersections are currently operating at LOS E or F:

- Madison Avenue/Murrieta Hot Springs Road;
- California Oaks Road/Clinton Keith Road;
- Hancock Avenue/Los Alamos Road; and
- Whitewood Road/Murrieta Hot Springs Road.

4.2 Roadway Segment Analysis

Table 8 summarizes the existing Volume-to-Capacity (V/C) ratios and LOS at the roadway segments, utilizing the maximum daily roadway capacity values per the current Circulation Element. Daily volumes were calculated based on peak hour adjacent intersection approach and departure volumes, using a peak hour-to-daily volume ratio (i.e., K factor) developed from daily volume data at other locations provided by the City.

Table 8: Existing Daily Roadway Segment Level of Service

Segment		Lane Configuration	Capacity (vehicles/day)	Existing ADT	Volume to Capacity Ratio (V/C)	LOS
1	Scott Rd east of Menifee Rd	4D	35,900	13,355	0.37	A
2	Scott Rd between Leon Rd and Winchester Rd (SR-79)	2U	13,000	6,930	0.53	A
3	Keller Rd between I-215 and Whitewood Rd	3D	19,500*	5,120	0.26	A
4	Keller Rd east of Whitewood Rd (future)	-	-	-	-	-
5	Baxter Rd between Antelope Rd and Whitewood Rd	4D	25,900	4,225	0.16	A
6	Antelope Rd between Baxter Rd and Clinton Keith Rd	2U	13,000	5,130	0.39	A
7	Whitewood Rd between Baxter Rd and Clinton Keith Rd	4D	34,100	18,305	0.54	A
8	Clinton Keith Rd west of Nutmeg St	4D	35,900	17,790	0.50	A
9	Clinton Keith Rd east of California Oaks Rd	4D	35,900	32,490	0.91	**E**
10	Clinton Keith Rd betweenI-215 and Whitewood Rd	6D	53,900	26,205	0.49	A
11	Clinton Keith Rd east of Whitewood Rd	6D	53,900	15,780	0.29	A
12	California Oaks Rd south of Clinton Keith Rd	4D	34,100	15,320	0.45	A
13	California Oaks Rd south of I-15	5D	44,875*	20,920	0.47	A
14	Jefferson Ave south of California Oaks Rd	4D	35,900	17,700	0.49	A
15	Los Alamos Rd between I-215 and Whitewood Rd	4D	35,900	29,230	0.81	**D**
16	Los Alamos Rd between Monroe Ave and Hancock Ave	4D	34,100	22,150	0.65	B
17	Whitewood Rd north of Murrieta Hot Springs Rd	4D	34,100	12,330	0.36	A
18	Jefferson Ave south of Murrieta Hot Springs Rd	4D	35,900	27,750	0.77	C
19	Murrieta Hot Springs Rd between I-15 and I-215	8D	71,800	38,200	0.53	A
20	Murrieta Hot Springs Rd between Alta Murrieta Dr and Whitewood Rd	6D	53,900	39,260	0.73	C
21	Murrieta Hot Springs Rd between Whitewood Rd and Margarita Rd	6D	53,900	45,560	0.85	**D**
22	Murrieta Hot Springs Rd between Margarita Rd and Winchester Rd (SR-79)	4D	35,900	29,310	0.82	**D**

Notes:
LOS = Level of Service.
* Capacity calculated based on per lane capacities from other designations.

As shown in **Table 8**, all segments are currently operating at LOS C or better with the exception of the following segments:

- Clinton Keith Road east of California Oaks Road;
- Los Alamos Road between I-215 and Whitewood Road;

- Murrieta Hot Springs Road between Whitewood Road and Margarita Road; and
- Murrieta Hot Springs Road between Margarita Road and Winchester Road (SR-79).

5 PROPOSED PROJECT

As previously discussed, the Focused GPU supersedes the 2011 Murrieta General Plan and subsequent General Plan Amendments through 2018. As this is a focused update, many portions of the 2011 General Plan will remain unchanged. With regards to land use, there are two key differences between the 2011 General Plan and the proposed General Plan. These differences are contained within six key areas of the City. The first difference is that the Focused GPU contains a new land use designation, Innovation. The second difference is the mix and location of land use designations within the six key areas.

5.1 Land Use

Table 9 shows the proposed project net changes in land use for residential and non-residential uses, including the new Innovation category.

Table 9: Proposed Project Net Land Use Changes

Land Use Description	Net Change
Large Lot Residential	-32 dwelling units
Single-Family Residential	-192 dwelling units
Multi-family Residential	+1,796 dwelling units
Commercial	+176,749 sq ft
Office & Research Park	-9,841,655 sq ft
Civic & Institutional	-91 sq ft
Innovation (new)	+7,259,396 sq ft
Mixed-Use	0 sq ft
Business Park	0 sq ft
Industrial	0 sq ft

The Focused GPU's anticipated change in dwelling units and non-residential square footage over the 2035 estimated buildout from the 2011 General Plan is:

- Addition of 1,572 dwelling units; and
- Reduction of 2,405,601 square feet of non-residential uses.

5.2 Traffic Forecasting

The traffic forecasting approach involved the development of a focused multi-modal, multi-class travel demand model for the City of Murrieta. This focused model is consistent with the 2016 SCAG RTP/SCS travel demand model assumptions and inputs as well as compatible with the current City of Murrieta Transportation Analysis Zone (TAZ) structure and land use as part of the adopted General Plan.

The base year of 2016 and the forecast year of 2040 were obtained from the 2016 SCAG RTP/SCS travel demand

model. The Model was developed using the TransCAD software package, the software platform currently used by SCAG for regional modeling. The City's highway network was updated and refined to include all key general plan roadways in the City of Murrieta. The transit network was also reviewed and found to be a satisfactory representation of transit services. The Model is consistent with the traditional four step modeling process, which includes trip generation, trip distribution, mode split, and traffic assignment.

5.2.1 Transportation Analysis Zones

The zone structure of the 2040 forecast year is identical to the zone structure of the base year, with only data inputs being modified. The land use data , described in **Table 9**, for each TAZ is converted to three (3) major socioeconomic variables (population, households and employment) and further disaggregated into secondary variables (e.g. household size, age, income level, employment type, etc.). **Table 10** summarizes the socioeconomic data (SED) under the currently adopted General Plan, the Focused General Plan Update, and the net change, applied as part of the traffic forecasting process.

Table 10: Citywide Socioeconomic Data Summary

Year	Currently Adopted General Plan			Focused General Plan Update			Net Change		
	HH	Pop	Emp	HH	Pop	Emp	HH	Pop	Emp
2040	44,805	135,419	95,029	46,377	139,825	92,087	1,572	4,406	-2,942

Note: HH = Households, Pop = Population, Emp = Employment

The process by which Iteris developed and validated the model is provided in a separate Model Development and Validation report within **Appendix C**. In addition, two land use alternatives were developed and evaluated in terms of Citywide Vehicle Miles Travel (VMT). The alternatives evaluation is provided in **Appendix D**.

5.2.2 Post-processing

The buildout year in the currently adopted General Plan is 2035. Thus, the year 2040 volumes were interpolated to the year 2035 and were used for the purposes of analyzing the traffic impacts of the focused General Plan Update, as opposed to 2040 which were taken directly from the 2016 SCAG RTP/SCS travel-demand model. The future year 2035 circulation network is anticipated to be modified significantly from the current network. For example, major planned enhancements such as a new I-215 interchange at Keller Road, extension of Keller Road to Leon Road, extension of Clinton Keith Road east of Whitewood Road, and a new Warm Springs Parkway running parallel to I-215 are anticipated in the City's buildout condition. As such, more so than simply a change in traffic volume magnitude, traffic patterns in the study area will be largely different than existing conditions.

Existing turning movement count data is typically used as a "pivot point" for projecting future year turning movement volumes, where intersection and roadway capacities remain mostly static between baseline and future (i.e., a currently built out environment). However, considering Murrieta's long-range planned buildout condition, this method is not applicable. Rather, turning movement volumes at the study intersections are acquired directly from the model, consistently applied to the "without project" and "with project" conditions.

Future year peak hour turning movements acquired from the traffic model were adjusted to year 2035, from the model buildout year 2040. As part of typical post-processing, turning movements were scaled and balanced where appropriate in order to ensure consistent traffic flow.

6 FUTURE YEAR 2035 WITHOUT PROJECT CONDITIONS

As mentioned, the buildout year in the currently adopted General Plan is 2035. Thus, the year 2040 volumes were interpolated to the year 2035 and were used for the purposes of analyzing the traffic impacts of the focused General Plan Update, as opposed to 2040 which were taken directly from the 2016 SCAG RTP/SCS travel-demand model. This section presents the analysis of traffic operations with the buildout of the currently adopted General Plan (i.e., "without project" conditions) in 2035. Future year 2035 without project traffic volumes were developed based on traffic modeling and post-processing procedures described in Section 5. **Figure 6-1** shows the future year 2035 without project intersection traffic volumes. **Figure 6-2** shows the future year 2035 without project intersection lane configurations, consistent with the currently adopted Circulation Element.

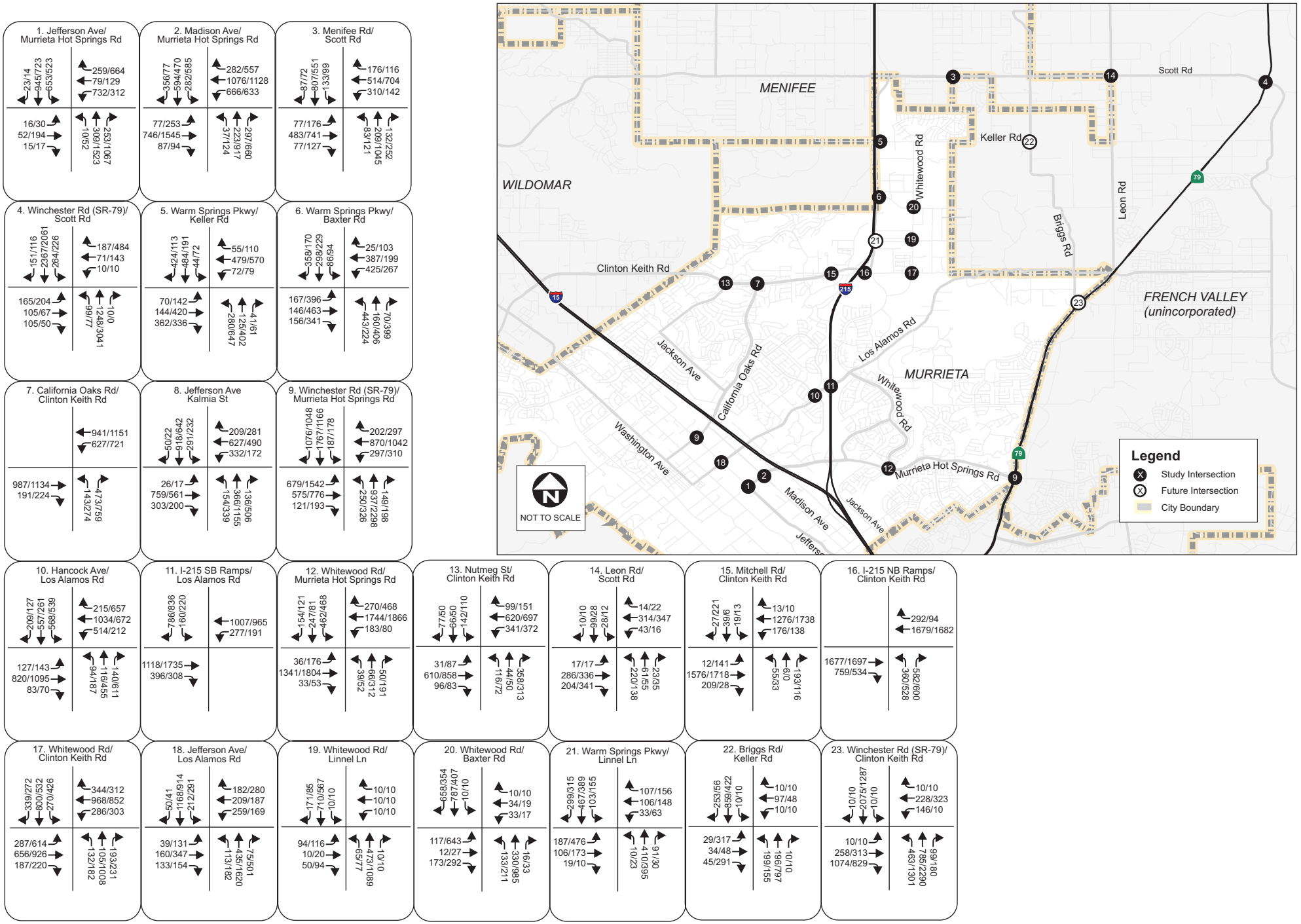

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Figure 6-1
Future Year 2035 Without Project Intersection Volumes

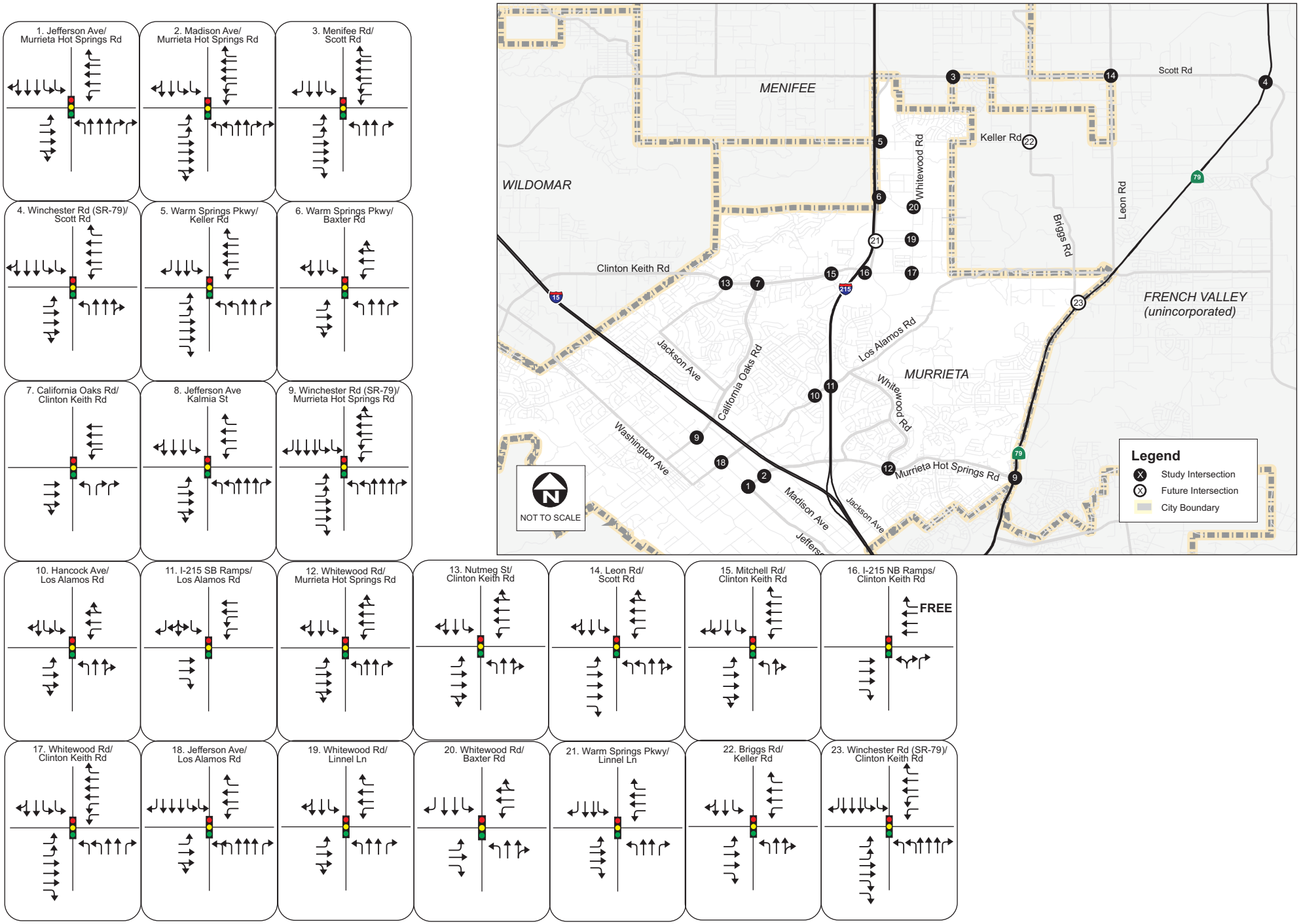

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Figure 6-2
Future Year 2035 Without Project Intersection Lane Configurations

6.1 Intersection Analysis

A level of service analysis was conducted to evaluate future year 2035 without project intersection operations during the a.m. and p.m. peak hours at the study intersections. **Table 11** summarizes the future year 2035 without project peak hour LOS at the study intersections. LOS calculation sheets are provided in **Appendix B**.

Table 11: Future Year 2035 Without Project Intersection Peak Hour Level of Service

Intersection		Control Type	AM Peak Hour		PM Peak Hour	
			Delay (sec)	LOS	Delay (sec)	LOS
1	Jefferson Ave/Murrieta Hot Springs Rd	signalized	**97.6**	**F**	**126.5**	**F**
2	Madison Ave/Murrieta Hot Springs Rd	signalized	46.9	D	**99.2**	**F**
3	Menifee Rd/Scott Rd	signalized	28.8	C	31.9	C
4	Winchester Rd (SR-79)/Scott Rd	signalized	50.3	D	**156.1**	**F**
5	Warm Springs Pkwy/Keller Rd	signalized	37.0	D	42.5	D
6	Warm Springs Pkwy/Baxter Rd	signalized	**67.1**	**E**	52.7	D
7	California Oaks Rd/Clinton Keith Rd	signalized	44.5	D	**63.7**	**E**
8	Jefferson Ave/Kalmia St	signalized	**58.7**	**E**	50.3	D
9	Winchester Rd (SR-79)/Murrieta Hot Springs Rd	signalized	**125.2**	**F**	**254.2**	**F**
10	Hancock Ave/Los Alamos Rd	signalized	**139.1**	**F**	**144.9**	**F**
11	I-215 SB Ramps/Los Alamos Rd	signalized	26.8	C	32.9	C
12	Whitewood Rd/Murrieta Hot Springs Rd	signalized	**96.1**	**F**	**143.9**	**F**
13	Nutmeg St/Clinton Keith Rd	signalized	30.7	C	32.2	C
14	Leon Rd/Scott Rd	signalized	14.4	B	12.7	B
15	Mitchell Rd/Clinton Keith Rd	signalized	34.9	C	34.7	C
16	I-215 NB Ramps/Clinton Keith Rd	signalized	29.1	C	35.9	D
17	Whitewood Rd/Clinton Keith Rd	signalized	**57.3**	**E**	**76.5**	**E**
18	Jefferson Ave/Los Alamos Rd	signalized	28.3	C	37.7	D
19	Whitewood Rd/Linnel Ln	signalized	14.5	B	15.4	B
20	Whitewood Rd/Baxter Rd	signalized	25.6	C	**58.8**	**E**
21	Warm Springs Pkwy/Linnel Ln	signalized	16.9	B	29.0	C
22	Briggs Rd/Keller Rd	signalized	17.3	B	19.9	B
23	Winchester Rd (SR-79)/Clinton Keith Rd	signalized	**93.5**	**F**	**101.9**	**F**

Notes:
LOS = Level of Service.

As shown in **Table 11**, the following intersections are forecast to operate at LOS E or F:

- Jefferson Avenue/Murrieta Hot Springs Road;
- Madison Avenue/Murrieta Hot Springs Road;
- Winchester Road (SR-79)/Scott Road;
- Warm Springs Parkway/Baxter Road;

- California Oaks Road/Clinton Keith Road;
- Jefferson Avenue/Kalmia Street;
- Winchester Road (SR-79)/Murrieta Hot Springs Road;
- Hancock Avenue/Los Alamos Road;
- Whitewood Road/Murrieta Hot Springs Road;
- Whitewood Road/Clinton Keith Road;
- Whitewood Road/Baxter Road; and
- Winchester Road (SR-79)/Clinton Keith Road.

6.2 Roadway Segment Analysis

Table 12 summarizes the future year 2035 without project V/C ratios and LOS at the roadway segments, assuming lane configurations consistent with the current Circulation Element as well as the maximum daily roadway capacity values per the current Circulation Element. Daily traffic volumes were developed based on traffic modeling procedures described in Section 5.

Table 12: Future Year 2035 Without Project Daily Roadway Segment Level of Service

Segment		Lane Configuration	Designation	Capacity (vehicles/day)	2035 Without Project ADT	Volume to Capacity Ratio (V/C)	LOS
1	Scott Rd east of Menifee Rd	6D	Arterial	53,900	9,550	0.18	A
2	Scott Rd between Leon Rd and Winchester Rd (SR-79)	6D	Arterial	53,900	8,120	0.15	A
3	Keller Rd between I-215 and Whitewood Rd	6D	Arterial	53,900	12,610	0.23	A
4	Keller Rd east of Whitewood Rd	4D	Secondary	25,900	10,970	0.42	A
5	Baxter Rd between Antelope Rd and Whitewood Rd	4D	Secondary	25,900	15,270	0.59	A
6	Warm Springs Pkwy between Baxter Rd and Clinton Keith Rd	4D	Major	34,100	12,150	0.36	A
7	Whitewood Rd between Baxter Rd and Clinton Keith Rd	4D	Major	34,100	12,250	0.36	A
8	Clinton Keith Rd west of Nutmeg St	6D	Arterial	53,900	23,190	0.43	A
9	Clinton Keith Rd east of California Oaks Rd	6D	Arterial	53,900	43,780	0.81	**D**
10	Clinton Keith Rd between I-215 and Whitewood Rd	6D	Urban Arterial	53,900	22,500	0.42	A
11	Clinton Keith Rd east of Whitewood Rd	6D	Urban Arterial	53,900	24,990	0.46	A
12	California Oaks Rd south of Clinton Keith Rd	4D	Major	34,100	22,960	0.67	B
13	California Oaks Rd south of I-15	6D	Arterial	53,900	25,130	0.47	A
14	Jefferson Ave south of California Oaks Rd	6D	Arterial	53,900	44,190	0.82	D
15	Los Alamos Rd between I-215 and Whitewood Rd	6D	Arterial	53,900	23,850	0.44	A
16	Los Alamos Rd between Monroe Ave and Hancock Ave	4D	Major	34,100	36,560	1.07	**F**
17	Whitewood Rd north of Murrieta Hot Springs Rd	4D	Major	34,100	6,040	0.18	A
18	Jefferson Ave south of Murrieta Hot Springs Rd	6D	Arterial	53,900	37,150	0.69	B
19	Murrieta Hot Springs Rd between I-15 and I-215	8D	Augmented Urban Arterial	71,800	74,560	1.04	**F**
20	Murrieta Hot Springs Rd between Alta Murrieta Dr and Whitewood Rd	6D	Multi-Modal Transportation	53,900	49,280	0.91	**E**
21	Murrieta Hot Springs Rd between Whitewood Rd and Margarita Rd	6D	Multi-Modal Transportation	53,900	47,680	0.88	**D**
22	Murrieta Hot Springs Rd between Margarita Rd and Winchester Rd (SR-79)	6D	Multi-Modal Transportation	53,900	38,600	0.72	C

Notes:
ADT volume in 2035 is rounded to the nearest 10 vehicles.
LOS = Level of Service.

As shown in **Table 12**, the following roadways are forecast to operate at LOS D, E or F in future year 2035 without project conditions:

- Clinton Keith Road east of California Oaks Road;
- Jefferson Avenue south of California Oaks Road (acceptable, as part of GP focus area);
- Los Alamos Road between Monroe Avenue and Hancock Avenue;

- Murrieta Hot Springs Road between I-15 and I-215;
- Murrieta Hot Springs Road between Alta Murrieta Drive and Whitewood Road; and
- Murrieta Hot Springs Road between Whitewood Road and Margarita Road.

7 FUTURE YEAR 2035 WITH PROJECT CONDITIONS

This section presents the analysis of traffic operations with the buildout of the proposed Focused General Plan Update (i.e., "with project" conditions) in 2035. Future year 2035 with project traffic conditions include land use changes within six focused areas of the City, as described in Section 5. In addition, based on an initial model run and discussions with City Public Works Department staff, the following roadway classification or configuration modifications to the currently adopted circulation network were identified (shown in **Figure 7-1**):

- Hawthorn Street is downgraded from an Arterial road (6-lane) (in the current Circulation Element) to a Secondary road (4-lane), between Washington Avenue and Jefferson Avenue;
- Monroe Avenue is downgraded from a Major road (4-lane) (in the current Circulation Element) to an Industrial Collector road (2-lane), between Guava Avenue and Larchmont Lane;
- Ivy Street is downgraded from a Major road (in the current Circulation Element) to a Secondary road, between Washington Avenue and Jefferson Avenue; and
- Madison Avenue is downgraded from a Major road (in the current Circulation Element) to a Secondary road, between Guava Street and Date Street.

Future year 2035 with project traffic volumes were developed based on traffic modeling and post-processing procedures described in Section 5. **Figure 7-2** shows the future year 2035 with project peak hour intersection volumes.

7.1 Intersection Analysis

A level of service analysis was conducted to evaluate future year 2035 with project intersection operations during the a.m. and p.m. peak hours at the study intersections. **Table 13** summarizes the future year 2035 with project peak hour LOS at the study intersections. With the exception of the downgraded roadway classifications described, the LOS analysis utilizes the same intersection lane configurations used in the "without project" scenario (shown in **Figure 6-2**). LOS calculation sheets are provided in **Appendix B**.

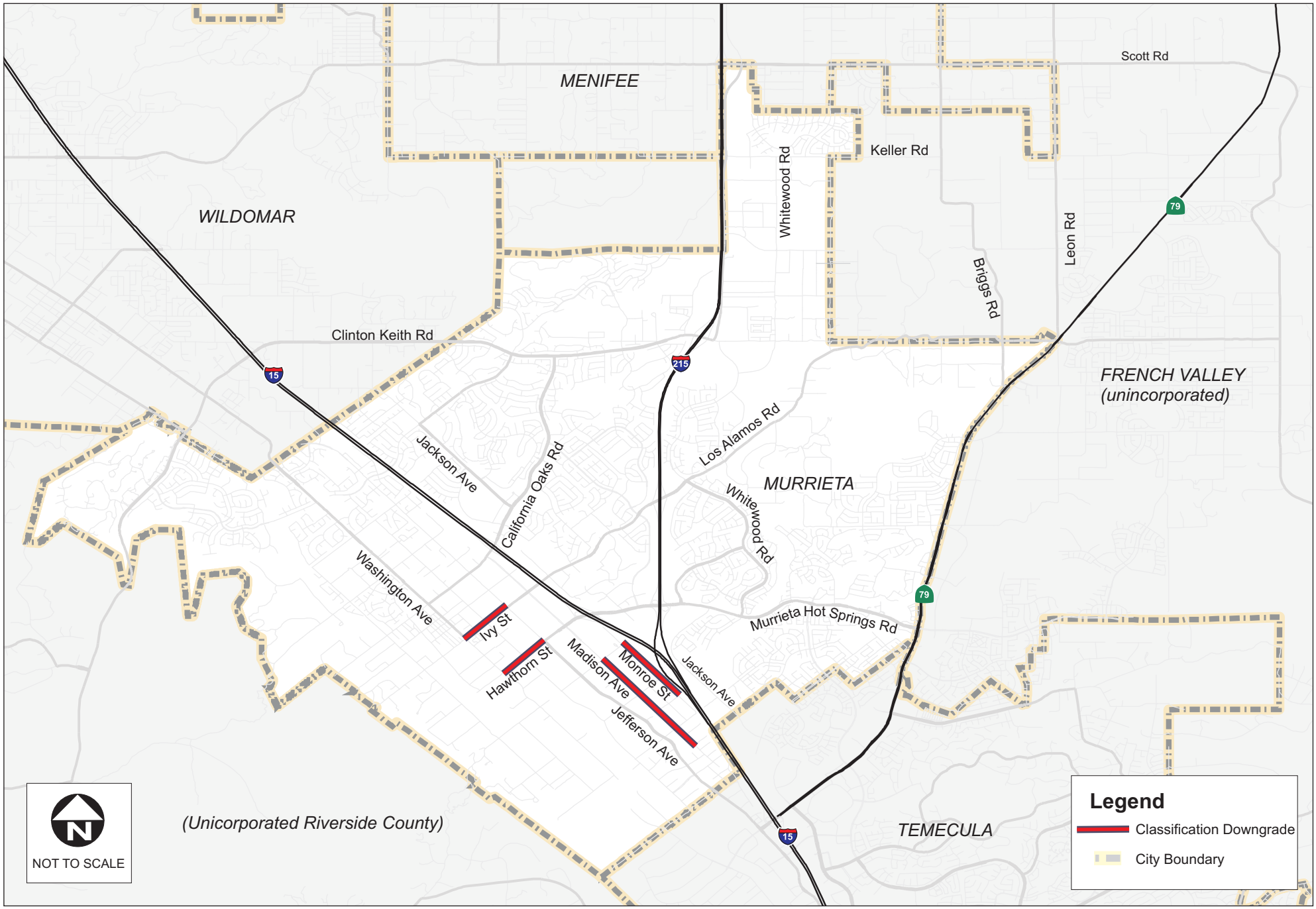

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Figure 7-1
Roadway Classification Downgrade Locations

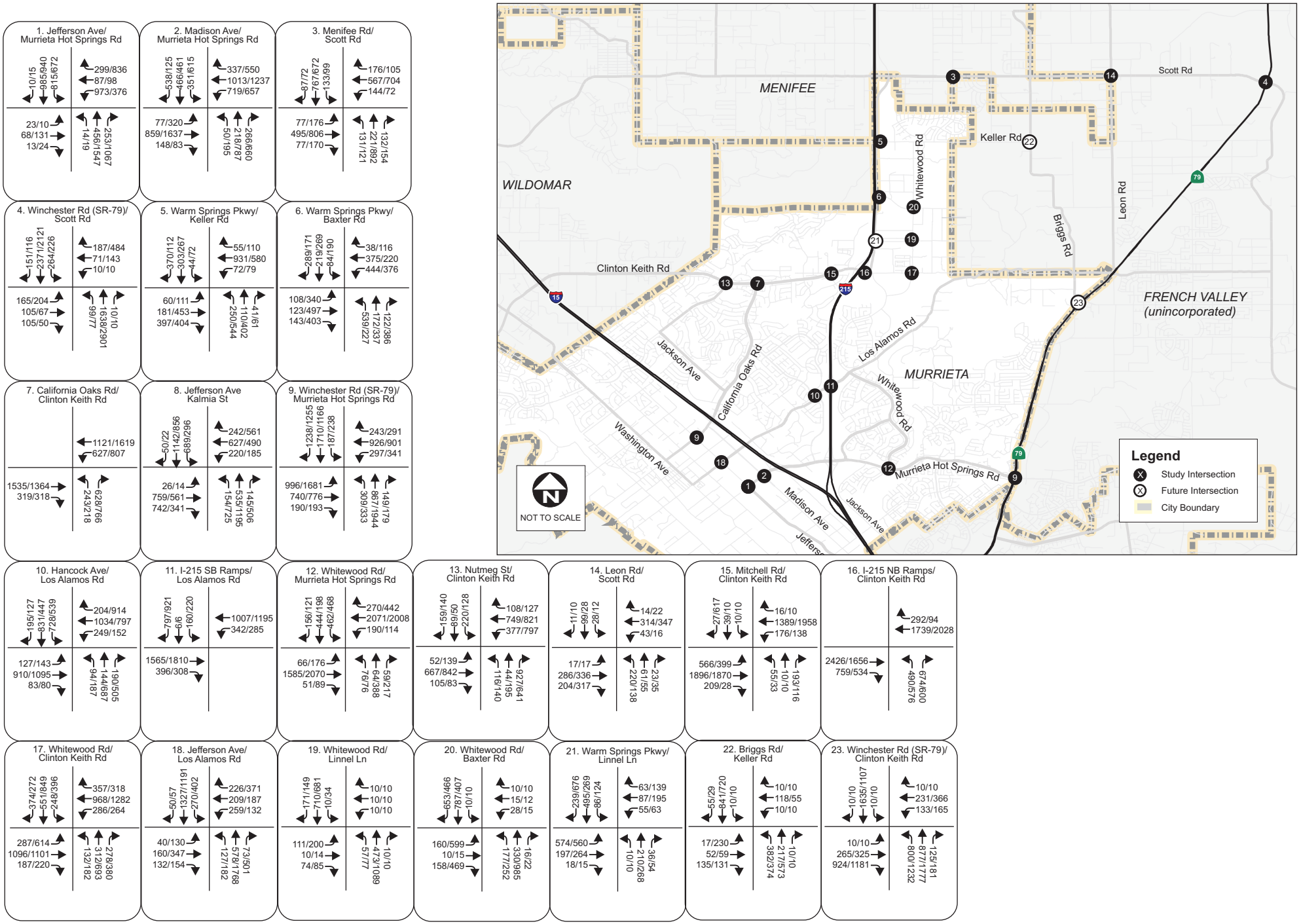

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Figure 7-2
Future Year 2035 With Project Intersection Volumes

Table 13: Future Year 2035 With Project Intersection Peak Hour Level of Service

	Intersection	Future Year 2035 Without Project				Future Year 2035 With Project				Change in AM Delay (sec)	Change in PM Delay (sec)	Significant Impact?
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour				
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS			
1	Jefferson Ave/Murrieta Hot Springs Rd	**97.6**	**F**	**126.5**	**F**	**186.3**	**F**	**163.2**	**F**	88.7	36.7	**Yes**
2	Madison Ave/Murrieta Hot Springs Rd	46.9	D	**99.2**	**F**	**55.5**	**E**	**108.9**	**F**	8.6	9.7	**Yes**
3	Menifee Rd/Scott Rd	28.8	C	31.9	C	28.7	C	30.8	C	-0.1	-1.1	No
4	Winchester Rd (SR-79)/Scott Rd	50.3	D	**156.1**	**F**	50.3	D	**135.9**	**F**	0.0	-20.2	No
5	Warm Springs Pkwy/Keller Rd	37.0	D	42.5	D	37.4	D	40.3	D	0.4	-2.2	No
6	Warm Springs Pkwy/Baxter Rd	**67.1**	**E**	52.7	D	**68.7**	**E**	**72.5**	**E**	1.6	19.8	**Yes**
7	California Oaks Rd/Clinton Keith Rd	44.5	D	**63.7**	**E**	**79.7**	**E**	**91.4**	**F**	35.2	27.7	**Yes**
8	Jefferson Ave/Kalmia St	**58.7**	**E**	50.3	D	**153.5**	**F**	**75.0**	**E**	94.8	24.7	**Yes**
9	Winchester Rd (SR-79)/Murrieta Hot Springs Rd	**125.2**	**F**	**254.2**	**F**	**197.2**	**F**	**299.8**	**F**	72.0	45.6	**Yes**
10	Hancock Ave/Los Alamos Rd	**139.1**	**F**	**144.9**	**F**	**160.2**	**F**	**188.1**	**F**	21.1	43.2	**Yes**
11	I-215 SB Ramps/Los Alamos Rd	26.8	C	32.9	C	32.4	C	52.6	D	5.6	19.7	No
12	Whitewood Rd/Murrieta Hot Springs Rd	**96.1**	**F**	**143.9**	**F**	**130.1**	**F**	**160.4**	**F**	34.0	16.5	**Yes**
13	Nutmeg St/Clinton Keith Rd	30.7	C	32.2	C	**161.2**	**F**	**126.3**	**F**	130.5	94.1	**Yes**
14	Leon Rd/Scott Rd	14.4	B	12.7	B	14.4	B	12.6	B	0.0	-0.1	No
15	Mitchell Rd/Clinton Keith Rd	34.9	C	34.7	C	**63.0**	**E**	**62.5**	**E**	28.1	27.8	**Yes**
16	I-215 NB Ramps/Clinton Keith Rd	29.1	C	35.9	D	**65.3**	**E**	42.6	D	36.2	6.7	**Yes**
17	Whitewood Rd/Clinton Keith Rd	**57.3**	**E**	**76.5**	**E**	52.2	D	**85.3**	**F**	-5.1	8.8	**Yes**
18	Jefferson Ave/Los Alamos Rd	28.3	C	37.7	D	29.6	C	53.0	D	1.3	15.3	No
19	Whitewood Rd/Linnel Ln	14.5	B	15.4	B	15.3	B	19.6	B	0.8	4.2	No
20	Whitewood Rd/Baxter Rd	25.6	C	**58.8**	**E**	28.4	C	**65.8**	**E**	2.8	7.0	**Yes**
21	Warm Springs Pkwy/Linnel Ln	16.9	B	29.0	C	23.6	C	**75.5**	**E**	6.7	46.5	**Yes**
22	Briggs Rd/Keller Rd	17.3	B	19.9	B	23.1	C	25.3	C	5.8	5.4	No
23	Winchester Rd (SR-79)/Clinton Keith Rd	**93.5**	**F**	**101.9**	**F**	**104.6**	**F**	**155.3**	**F**	11.1	53.4	**Yes**

Notes: LOS = Level of Service.

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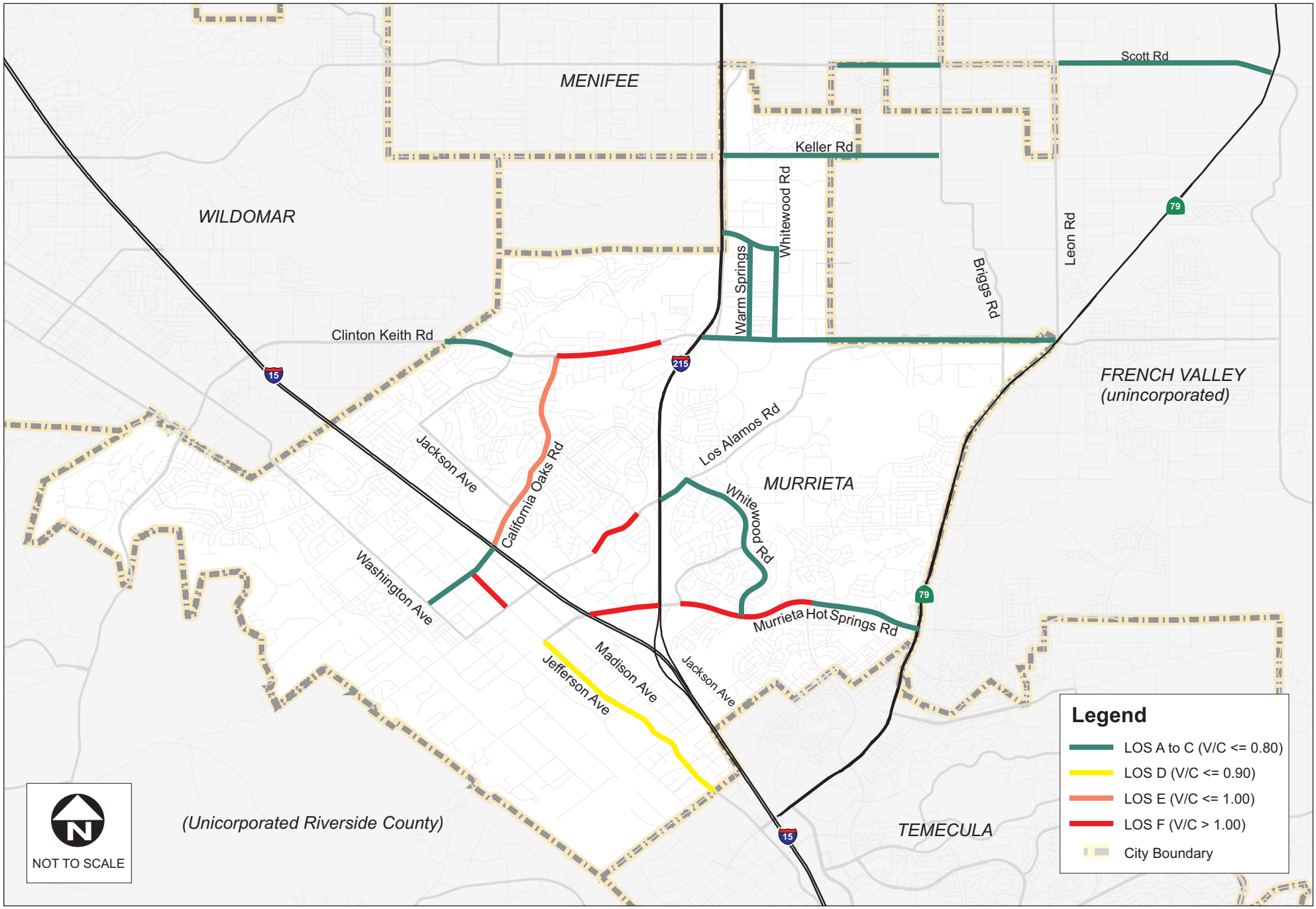
As shown in **Table 13**, traffic related to the proposed project's land use modifications are forecast to result in significant traffic impacts, based on the criteria described in Section 3.1, at the following intersections in future year 2035:

- Jefferson Avenue/Murrieta Hot Springs Road;
- Madison Avenue/Murrieta Hot Springs Road;
- Warm Springs Parkway/Baxter Road;
- California Oaks Road/Clinton Keith Road;
- Jefferson Avenue/Kalmia Street;
- Winchester Road (SR-79)/Murrieta Hot Springs Road;
- Hancock Avenue/Los Alamos Road;
- Whitewood Road/Murrieta Hot Springs Road;
- Nutmeg Street/Clinton Keith Road;
- Mitchell Road/Clinton Keith Road;
- I-215 Northbound Ramps/Clinton Keith Road;
- Whitewood Road/Clinton Keith Road;
- Whitewood Road/Baxter Road;
- Warm Springs Parkway/Linnel Lane; and
- Winchester Road (SR-79)/Clinton Keith Road.

7.2 Roadway Segment Analysis

Table 14 summarizes the future year 2035 with project V/C ratios and LOS at the roadway segments, assuming lane configurations consistent with the adopted Circulation Element as well as the maximum daily roadway capacity values per the adopted Circulation Element. With the exception of the downgraded roadway classifications described, the LOS analysis utilizes the same roadway lane configurations used in the "without project" scenario. Daily traffic volumes were developed based on traffic modeling procedures described in Section 5. **Figure 7-3** shows the LOS, based on V/C ratio, at the roadway segments.



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City of Murrieta
Focused General Plan Update
Traffic Impact Analysis

Figure 7-3
Future Year 2035 With Project Roadway Segment LOS

Table 14: Future Year 2035 With Project Daily Roadway Segment Level of Service

Segment		Lane Configuration	Designation	Capacity (vehicles/day)	2035 With Project ADT	Volume to Capacity Ratio (V/C)	LOS
1	Scott Rd east of Menifee Rd	6D	Arterial	53,900	9,040	0.17	A
2	Scott Rd between Leon Rd and Winchester Rd (SR-79)	6D	Arterial	53,900	8,120	0.15	A
3	Keller Rd between I-215 and Whitewood Rd	6D	Arterial	53,900	15,460	0.29	A
4	Keller Rd east of Whitewood Rd	4D	Secondary	25,900	11,660	0.45	A
5	Baxter Rd between Antelope Rd and Whitewood Rd	4D	Secondary	25,900	16,040	0.62	B
6	Warm Springs Pkwy between Baxter Rd and Clinton Keith Rd	4D	Major	34,100	11,020	0.32	A
7	Whitewood Rd between Baxter Rd and Clinton Keith Rd	4D	Major	34,100	12,980	0.38	A
8	Clinton Keith Rd west of Nutmeg St	6D	Arterial	53,900	27,410	0.51	A
9	Clinton Keith Rd east of California Oaks Rd	6D	Arterial	53,900	57,630	1.07	**F**
10	Clinton Keith Rd between I-215 and Whitewood Rd	6D	Urban Arterial	53,900	27,400	0.51	A
11	Clinton Keith Rd east of Whitewood Rd	6D	Urban Arterial	53,900	30,930	0.57	A
12	California Oaks Rd south of Clinton Keith Rd	4D	Major	34,100	31,470	0.92	**E**
13	California Oaks Rd south of I-15	6D	Arterial	53,900	31,640	0.59	A
14	Jefferson Ave south of California Oaks Rd	6D	Arterial	53,900	55,800	1.04	**F**
15	Los Alamos Rd between I-215 and Whitewood Rd	6D	Arterial	53,900	31,690	0.59	A
16	Los Alamos Rd between Monroe Ave and Hancock Ave	4D	Major	34,100	40,320	1.18	**F**
17	Whitewood Rd north of Murrieta Hot Springs Rd	4D	Major	34,100	11,330	0.33	A
18	Jefferson Ave south of Murrieta Hot Springs Rd	6D	Arterial	53,900	44,210	0.82	D
19	Murrieta Hot Springs Rd between I-15 and I-215	8D	Augmented Urban Arterial	71,800	79,600	1.11	**F**
20	Murrieta Hot Springs Rd between Alta Murrieta Dr and Whitewood Rd	6D	Multi-Modal Transportation	53,900	58,620	1.09	**F**
21	Murrieta Hot Springs Rd between Whitewood Rd and Margarita Rd	6D	Multi-Modal Transportation	53,900	58,330	1.08	**F**
22	Murrieta Hot Springs Rd between Margarita Rd and Winchester Rd (SR-79)	6D	Multi-Modal Transportation	53,900	42,440	0.79	C

Notes:
ADT volume in 2035 is rounded to the nearest 10 vehicles.
LOS = Level of Service.

As shown in **Table 14**, traffic related to the proposed project's land use modifications are forecast to result in significant traffic impacts, based on the criteria described in Section 3.1, at the following roadway segments in future year 2035:

- Clinton Keith Road east of California Oaks Road;

- California Oaks Road south of Clinton Keith Road;
- Jefferson Avenue south of California Oaks Road;
- Los Alamos Road between Monroe Avenue and Hancock Avenue;
- Murrieta Hot Springs Road between I-15 and I-215;
- Murrieta Hot Springs Road between Alta Murrieta Drive and Whitewood Road; and
- Murrieta Hot Springs Road between Whitewood Road and Margarita Road.

8 POTENTIAL IMPROVEMENTS

Based on the results of the traffic impact analysis, several intersections are forecast to be impacted by the land use modifications from the Focused GPU. In order to potentially alleviate the significant impacts, the following improvements are recommended through coordination with City staff:

- **1. Jefferson Avenue/Murrieta Hot Springs Road** – At the westbound Murrieta Hot Springs Road approach, add a second left-turn lane. Modify the traffic signal phasing to include a northbound right-turn overlap phase.

- **2. Madison Avenue/Murrieta Hot Springs Road** – Widen the eastbound Murrieta Hot Springs Road approach to include a dedicated right-turn lane. Modify the traffic signal phasing to include a westbound right-turn overlap phase.

- **4. Winchester Road (SR-79)/Scott Road** – Modify the traffic signal phasing to include a westbound right-turn overlap phase.

- **6. Warm Springs Parkway/Baxter Road** – Widen the eastbound Baxter Road approach to include a dedicated right-turn lane and modify the traffic signal phasing to include an eastbound right-turn overlap phase.

- **7. California Oaks Road/Clinton Keith Road** - At the westbound Clinton Keith Road approach, add a second left-turn lane.

- **8. Jefferson Avenue/Kalmia Street** - At the southbound Jefferson Avenue approach, add a second left-turn lane. Widen the eastbound Kalmia Street approach to include a dedicated right-turn lane. Modify the traffic signal phasing to include protected plus permitted phasing at the Kalmia Street eastbound and westbound approaches.

- **9. Winchester Road (SR-79)/Murrieta Hot Springs Road** – No feasible improvements identified, significant unavoidable impact.

- **10. Hancock Avenue/Los Alamos Road** – No feasible improvements identified, significant unavoidable impact.

- **12. Whitewood Road/Murrieta Hot Springs Road** – Widen the westbound Murrieta Hot Springs Road approach to include a dedicated right-turn lane and modify the traffic signal phasing to include a westbound right-turn overlap phase.

- **13. Nutmeg Street/Clinton Keith Road** - At the westbound Clinton Keith Road approach, add a second left-turn lane. Convert the second northbound Nutmeg Street through lane to a dedicated right-turn lane

(same configuration as existing conditions) and modify the traffic signal phasing to include a northbound right-turn overlap phase.

- **15. Mitchell Road/Clinton Keith Road** – Modify the traffic signal phasing to include protected plus permitted phasing at the Clinton Keith Road eastbound and westbound approaches.

- **16. I-215 Northbound Ramps/Clinton Keith Road** – At the northbound I-215 Off-ramp approach, add a dedicated left-turn lane, resulting in the approach lane configuration of one left-turn lane, one shared left-turn/right-turn lane, and one right-turn lane.

- **17. Whitewood Road/Clinton Keith Road** – No feasible improvements identified, significant unavoidable impact.

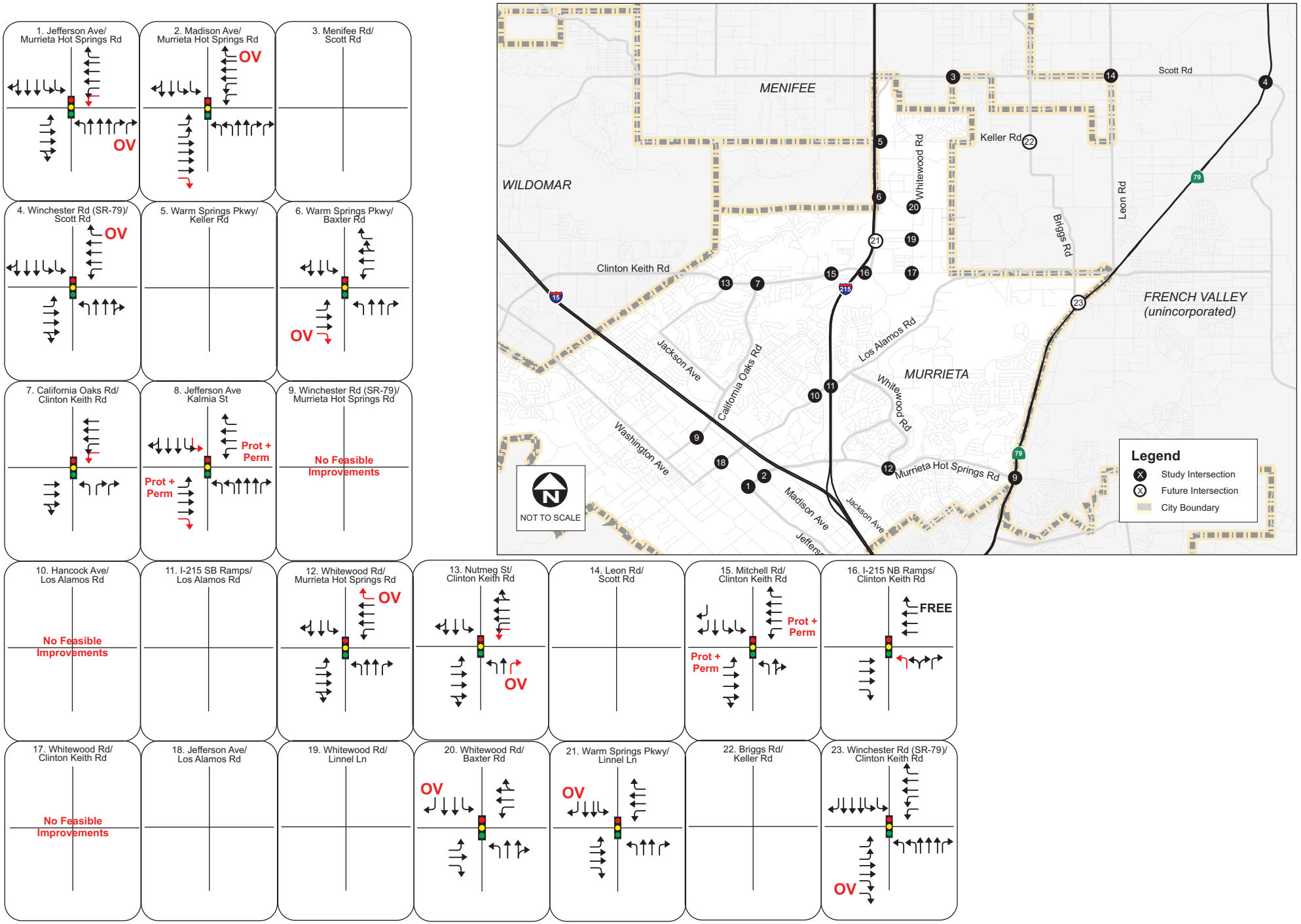
- **20. Whitewood Road/Baxter Road** - Modify the traffic signal phasing to include a southbound right-turn overlap phase.

- **21. Warm Springs Parkway/Linnel Lane** - Modify the traffic signal phasing to include a southbound right-turn overlap phase.

- **23. Winchester Road (SR-79)/Clinton Keith Road -** Modify the traffic signal phasing to include an eastbound right-turn overlap phase.

Figure 8-1 shows the potential lane configuration or signal phasing improvements as described.

Table 15 summarizes the future year 2035 with project peak hour LOS at the study intersections with implementation of the potential improvements. LOS calculation sheets are provided in **Appendix B**.



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City of Murrieta
Focused General Plan Update
Traffic Impact Analysis

Figure 8-1
Potential Intersection Improvements

Table 15: Future Year 2035 With Project With Potential Improvements Intersection Peak Hour Level of Service

	Intersection	Future Year 2035 Without Project				Future Year 2035 With Project With Potential Improvements				Change in AM Delay (sec)	Change in PM Delay (sec)	Significant Impact?
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour				
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS			
1	Jefferson Ave/Murrieta Hot Springs Rd	**97.6**	**F**	**126.5**	**F**	**66.7**	**E**	**111.4**	**F**	-30.9	-15.1	No
2	Madison Ave/Murrieta Hot Springs Rd	46.9	D	**99.2**	**F**	53.6	D	**91.7**	**F**	6.7	-7.5	No
4	Winchester Rd (SR-79)/Scott Rd	50.3	D	**156.1**	**F**	46.4	D	**103.5**	**F**	-3.9	-52.6	No
6	Warm Springs Pkwy/Baxter Rd	**67.1**	**E**	52.7	D	**60.3**	**E**	53.0	D	-6.8	0.3	No
7	California Oaks Rd/Clinton Keith Rd	44.5	D	**63.7**	**E**	38.0	D	37.1	D	-6.5	-26.6	No
8	Jefferson Ave/Kalmia St	**58.7**	**E**	50.3	D	**87.0**	**F**	**56.4**	**E**	28.3	6.1	**Yes**
9	Winchester Rd (SR-79)/Murrieta Hot Springs Rd	No feasible Improvements										**Yes**
10	Hancock Ave/Los Alamos Rd	No feasible Improvements										**Yes**
12	Whitewood Rd/Murrieta Hot Springs Rd	**96.1**	**F**	**143.9**	**F**	**111.4**	**F**	**136.2**	**F**	15.3	-7.7	**Yes**
13	Nutmeg St/Clinton Keith Rd	30.7	C	32.2	C	37.9	D	32.6	C	7.2	0.4	No
15	Mitchell Rd/Clinton Keith Rd	34.9	C	34.7	C	54.2	D	52.9	D	19.3	18.2	No
16	I-215 NB Ramps/Clinton Keith Rd	35.1	D	36.6	D	30.3	C	25.6	C	-4.8	-11.0	No
17	Whitewood Rd/Clinton Keith Rd	No feasible Improvements										**Yes**
20	Whitewood Rd/Baxter Rd	25.6	C	**58.8**	**E**	21.7	C	54.2	D	-3.9	-4.6	No
21	Warm Springs Pkwy/Linnel Ln	16.9	B	29.0	C	21.3	C	29.5	C	4.4	0.5	No
23	Winchester Rd (SR-79)/Clinton Keith Rd	**93.5**	**F**	**101.9**	**F**	38.5	D	35.8	D	-55.0	-66.1	No

Notes: LOS = Level of Service.

As shown in **Table 15**, with the potential improvements, traffic operations at most of the intersections are forecast to improve to either acceptable conditions (LOS D or better) or to a level considered less than significant (below "without project" levels). However, at the following intersections, feasible improvements were not identified or feasible improvement measures did not result in improved delays to below "without project" levels:

- Jefferson Avenue/Kalmia Street;
- Winchester Road (SR-79)/Murrieta Hot Springs Road;
- Hancock Avenue/Los Alamos Road;
- Whitewood Road/Murrieta Hot Springs Road; and
- Whitewood Road/Clinton Keith Road.

9 CONCLUSIONS

This report summarizes the results of the TIA for the City of Murrieta Focused General Plan Update (GPU). The Focused GPU supersedes the 2011 Murrieta General Plan and subsequent General Plan Amendments through 2018. The Focused GPU contains a new land use designation, Innovation, and also includes changes in the mix and location of land use designations within the six key areas.

9.1 Existing Conditions

Existing conditions includes the evaluation of the study area under current conditions, utilizing new traffic count data.

9.1.1 Intersections

In existing conditions, 20 key intersections are evaluated. The following intersections are currently operating at LOS E or F:

- Madison Avenue/Murrieta Hot Springs Road;
- California Oaks Road/Clinton Keith Road;
- Hancock Avenue/Los Alamos Road; and
- Whitewood Road/Murrieta Hot Springs Road.

9.1.2 Roadway Segments

In addition, 22 current roadway segments are evaluated using daily volumes and roadway capacities as described in the current Circulation Element. All segments are currently operating at LOS C or better with the exception of the following segments:

- Clinton Keith Road east of California Oaks Road;
- Los Alamos Road between I-215 and Whitewood Road;
- Murrieta Hot Springs Road between Whitewood Road and Margarita Road; and
- Murrieta Hot Springs Road between Margarita Road and Winchester Road (SR-79).

9.2 Future Year 2035 Without Project Conditions

Future year 2035 without project conditions includes the evaluation of the study area assuming the buildout of the currently adopted General Plan.

9.2.1 Intersections

A total of 23 intersections were analyzed as part of this scenario (including three future intersections not analyzed in existing conditions). Of the 23 intersections analyzed, the following 12 intersections are forecast to operate at LOS E or F:

- Jefferson Avenue/Murrieta Hot Springs Road;
- Madison Avenue/Murrieta Hot Springs Road;
- Winchester Road (SR-79)/Scott Road;
- Warm Springs Parkway/Baxter Road;
- California Oaks Road/Clinton Keith Road;
- Jefferson Avenue/Kalmia Street;
- Winchester Road (SR-79)/Murrieta Hot Springs Road;
- Hancock Avenue/Los Alamos Road;
- Whitewood Road/Murrieta Hot Springs Road;
- Whitewood Road/Clinton Keith Road;
- Whitewood Road/Baxter Road; and
- Winchester Road (SR-79)/Clinton Keith Road.

9.2.2 Roadway Segments

A total of 22 roadway segments were analyzed as part of this scenario. Of the 22 segments analyzed, the following 6 segments are forecast to operate at LOS D, E or F:

- Clinton Keith Road east of California Oaks Road;
- Jefferson Avenue south of California Oaks Road (acceptable, as part of GP focus area);
- Los Alamos Road between Monroe Avenue and Hancock Avenue;
- Murrieta Hot Springs Road between I-15 and I-215;
- Murrieta Hot Springs Road between Alta Murrieta Drive and Whitewood Road; and
- Murrieta Hot Springs Road between Whitewood Road and Margarita Road.

9.3 Future Year 2035 With Project Conditions

Future year 2035 with project conditions includes the evaluation of the study area assuming the buildout of the Focused General Plan Update. The same 23 intersections and 22 roadway segments were analyzed as part of this scenario. As part of this scenario, based on an initial model run and discussions with City Public Works Department staff, the following roadway classification or configuration modifications to the currently adopted circulation network were identified:

- Hawthorn Street is downgraded from an Arterial road (6-lane) (in the current Circulation Element) to a Secondary road (4-lane), between Washington Avenue and Jefferson Avenue;
- Monroe Avenue is downgraded from a Major road (4-lane) (in the current Circulation Element) to an Industrial Collector road (2-lane), between Guava Avenue and Larchmont Lane;
- Ivy Street is downgraded from a Major road (in the current Circulation Element) to a Secondary road, between Washington Avenue and Jefferson Avenue; and
- Madison Avenue is downgraded from a Major road (in the current Circulation Element) to a Secondary road, between Guava Street and Date Street.

9.3.1 Intersections

Of the 23 intersections analyzed, traffic related to the proposed project's land use modifications are forecast to result in significant traffic impacts at the following 15 intersections:

- Jefferson Avenue/Murrieta Hot Springs Road;
- Madison Avenue/Murrieta Hot Springs Road;
- Warm Springs Parkway/Baxter Road;
- California Oaks Road/Clinton Keith Road;
- Jefferson Avenue/Kalmia Street;
- Winchester Road (SR-79)/Murrieta Hot Springs Road;
- Hancock Avenue/Los Alamos Road;
- Whitewood Road/Murrieta Hot Springs Road;
- Nutmeg Street/Clinton Keith Road;
- Mitchell Road/Clinton Keith Road;
- I-215 Northbound Ramps/Clinton Keith Road;
- Whitewood Road/Clinton Keith Road;
- Whitewood Road/Baxter Road;
- Warm Springs Parkway/Linnel Lane; and
- Winchester Road (SR-79)/Clinton Keith Road.

9.3.2 Roadway Segments

Of the 22 segments analyzed, the proposed project's land use modifications are forecast to result in significant traffic impacts at the following 7 segments:

- Clinton Keith Road east of California Oaks Road;
- California Oaks Road south of Clinton Keith Road;
- Jefferson Avenue south of California Oaks Road;
- Los Alamos Road between Monroe Avenue and Hancock Avenue;
- Murrieta Hot Springs Road between I-15 and I-215;
- Murrieta Hot Springs Road between Alta Murrieta Drive and Whitewood Road; and
- Murrieta Hot Springs Road between Whitewood Road and Margarita Road.

9.4 Potential Improvements

9.4.1 Intersections

Based on the results of the traffic impact analysis, several intersections are forecast to be impacted by the land use modifications from the Focused GPU. Feasible potential improvements were developed, through coordination with City staff, at 13 intersections:

- **1. Jefferson Avenue/Murrieta Hot Springs Road** – At the westbound Murrieta Hot Springs Road approach, add a second left-turn lane. Modify the traffic signal phasing to include a northbound right-turn overlap phase.

- **2. Madison Avenue/Murrieta Hot Springs Road** – Widen the eastbound Murrieta Hot Springs Road approach to include a dedicated right-turn lane. Modify the traffic signal phasing to include a westbound right-turn overlap phase.

- **4. Winchester Road (SR-79)/Scott Road** – Modify the traffic signal phasing to include a westbound right-turn overlap phase.

- **6. Warm Springs Parkway/Baxter Road** – Widen the eastbound Baxter Road approach to include a dedicated right-turn lane and modify the traffic signal phasing to include an eastbound right-turn overlap phase.

- **7. California Oaks Road/Clinton Keith Road** - At the westbound Clinton Keith Road approach, add a second left-turn lane.

- **8. Jefferson Avenue/Kalmia Street** - At the southbound Jefferson Avenue approach, add a second left-turn lane. Widen the eastbound Kalmia Street approach to include a dedicated right-turn lane. Modify the traffic signal phasing to include protected plus permitted phasing at the Kalmia Street eastbound and westbound approaches.

- **9. Winchester Road (SR-79)/Murrieta Hot Springs Road** – No feasible improvements identified, significant unavoidable impact.

- **10. Hancock Avenue/Los Alamos Road** – No feasible improvements identified, significant unavoidable impact.

- **12. Whitewood Road/Murrieta Hot Springs Road** – Widen the westbound Murrieta Hot Springs Road approach to include a dedicated right-turn lane and modify the traffic signal phasing to include a westbound right-turn overlap phase.

- **13. Nutmeg Street/Clinton Keith Road** - At the westbound Clinton Keith Road approach, add a second left-turn lane. Convert the second northbound Nutmeg Street through lane to a dedicated right-turn lane (same configuration as existing conditions) and modify the traffic signal phasing to include a northbound right-turn overlap phase.

- **15. Mitchell Road/Clinton Keith Road** – Modify the traffic signal phasing to include protected plus permitted phasing at the Clinton Keith Road eastbound and westbound approaches.

- **16. I-215 Northbound Ramps/Clinton Keith Road** – At the northbound I-215 Off-ramp approach, add a dedicated left-turn lane, resulting in the approach lane configuration of one left-turn lane, one shared left-turn/right-turn lane, and one right-turn lane.

- **17. Whitewood Road/Clinton Keith Road –** No feasible improvements identified, significant unavoidable impact.

- **20. Whitewood Road/Baxter Road** - Modify the traffic signal phasing to include a southbound right-turn overlap phase.

- **21. Warm Springs Parkway/Linnel Lane** - Modify the traffic signal phasing to include a southbound right-turn overlap phase.

- **23. Winchester Road (SR-79)/Clinton Keith Road -** Modify the traffic signal phasing to include an eastbound right-turn overlap phase.

With the potential improvements, traffic operations at most of the intersections are forecast to improve to either acceptable conditions (LOS D or better) or to a level considered less than significant (below "without project" levels). However, at the following intersections, feasible improvements were not identified or feasible improvement measures did not result in improved delays to below "without project" levels:

- Jefferson Avenue/Kalmia Street;
- Winchester Road (SR-79)/Murrieta Hot Springs Road;
- Hancock Avenue/Los Alamos Road;
- Whitewood Road/Murrieta Hot Springs Road; and
- Whitewood Road/Clinton Keith Road.

9.4.2 Roadway Segments

Based on the results of the traffic impact analysis, 7 segments are forecast to be significantly impacted as a result of the proposed project's land use modifications. Potential improvements to roadway segment operations are limited to roadway widening to increase capacity (as opposed to intersection improvements that include less impactful measures such as signal phasing modifications). Thus, roadway segment improvements are not considered to be feasible.

APPENDIX F
TRAFFIC IMPACT ANALYSIS TECHNICAL APPENDIX

City of Murrieta Focused General Plan Update Traffic Impact Analysis

TECHNICAL APPENDIX

April 1, 2019

Submitted to:

Murrieta
the future of southern california

10173.19 | Prepared by **Iteris, Inc.**

APPENDIX A – TRAFFIC COUNT DATA

Counts Unlimited
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Murrieta
N/S: Jefferson Avenue
E/W: Murrieta Hot Springs Road
Weather: Clear

File Name : 01_MUR_Jefferson_MHS AM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

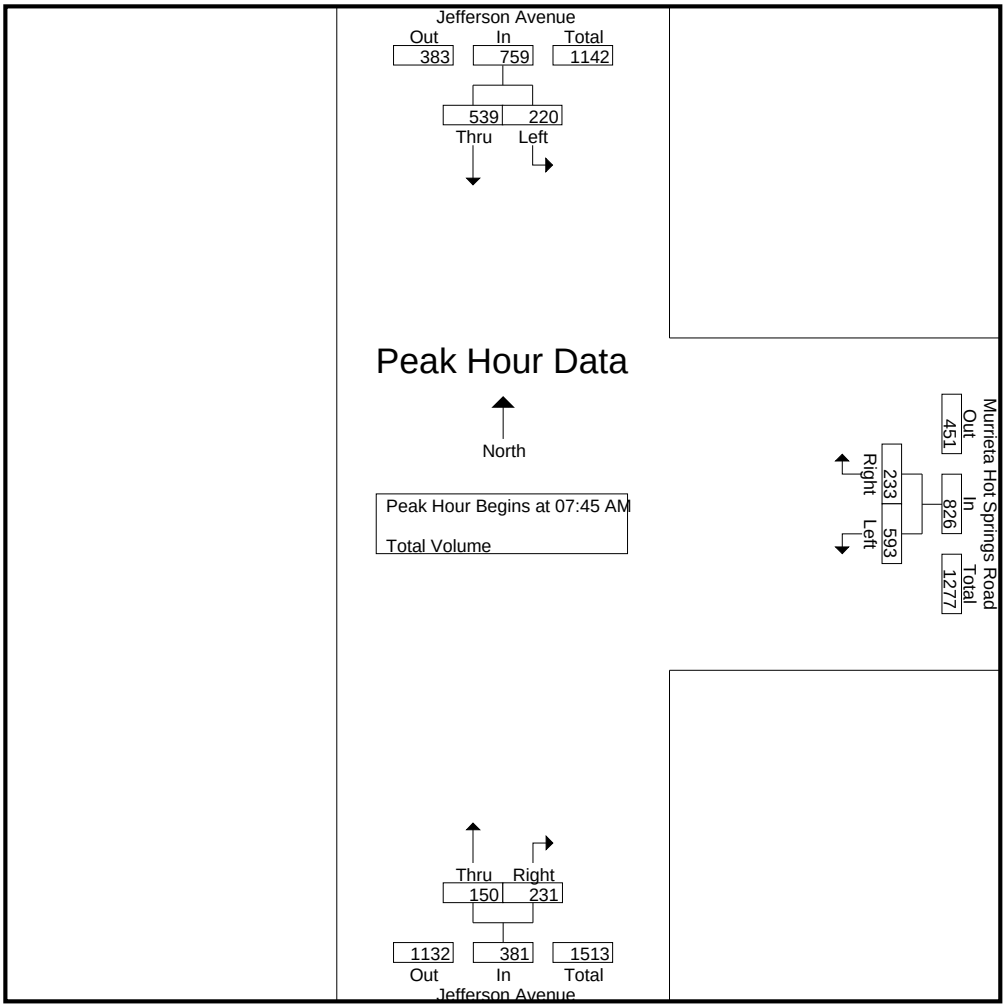
	Jefferson Avenue Southbound			Murrieta Hot Springs Road Westbound			Jefferson Avenue Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
07:00 AM	16	86	102	125	33	158	29	42	71	331
07:15 AM	39	103	142	128	40	168	24	50	74	384
07:30 AM	34	112	146	163	44	207	21	49	70	423
07:45 AM	46	145	191	188	75	263	28	43	71	525
Total	135	446	581	604	192	796	102	184	286	1663
08:00 AM	45	131	176	136	56	192	37	50	87	455
08:15 AM	62	107	169	134	41	175	51	59	110	454
08:30 AM	67	156	223	135	61	196	34	79	113	532
08:45 AM	64	143	207	113	58	171	54	75	129	507
Total	238	537	775	518	216	734	176	263	439	1948
Grand Total	373	983	1356	1122	408	1530	278	447	725	3611
Apprch %	27.5	72.5		73.3	26.7		38.3	61.7		
Total %	10.3	27.2	37.6	31.1	11.3	42.4	7.7	12.4	20.1	

	Jefferson Avenue Southbound			Murrieta Hot Springs Road Westbound			Jefferson Avenue Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:45 AM										
07:45 AM	46	145	191	**188**	**75**	**263**	28	43	71	525
08:00 AM	45	131	176	136	56	192	37	50	87	455
08:15 AM	62	107	169	134	41	175	**51**	59	110	454
08:30 AM	**67**	**156**	**223**	135	61	196	34	**79**	**113**	**532**
Total Volume	220	539	759	593	233	826	150	231	381	1966
% App. Total	29	71		71.8	28.2		39.4	60.6		
PHF	.821	.864	.851	.789	.777	.785	.735	.731	.843	.924

Counts Unlimited
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Murrieta
N/S: Jefferson Avenue
E/W: Murrieta Hot Springs Road
Weather: Clear

File Name : 01_MUR_Jefferson_MHS AM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	08:00 AM			07:30 AM			08:00 AM		
+0 mins.	45	131	176	163	44	207	37	50	87
+15 mins.	62	107	169	**188**	**75**	**263**	51	59	110
+30 mins.	**67**	**156**	**223**	136	56	192	34	**79**	113
+45 mins.	64	143	207	134	41	175	**54**	75	**129**
Total Volume	238	537	775	621	216	837	176	263	439
% App. Total	30.7	69.3		74.2	25.8		40.1	59.9	
PHF	.888	.861	.869	.826	.720	.796	.815	.832	.851

Counts Unlimited
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Murrieta
N/S: Jefferson Avenue
E/W: Murrieta Hot Springs Road
Weather: Clear

File Name : 01_MUR_Jefferson_MHS PM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	Jefferson Avenue Southbound			Murrieta Hot Springs Road Westbound			Jefferson Avenue Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
04:00 PM	56	95	151	71	56	127	229	240	469	747
04:15 PM	55	65	120	79	65	144	244	223	467	731
04:30 PM	68	67	135	69	60	129	268	264	532	796
04:45 PM	55	83	138	63	56	119	256	237	493	750
Total	234	310	544	282	237	519	997	964	1961	3024
05:00 PM	69	65	134	69	110	179	259	231	490	803
05:15 PM	66	89	155	78	142	220	287	237	524	899
05:30 PM	63	74	137	58	90	148	279	230	509	794
05:45 PM	51	65	116	56	98	154	269	197	466	736
Total	249	293	542	261	440	701	1094	895	1989	3232
Grand Total	483	603	1086	543	677	1220	2091	1859	3950	6256
Apprch %	44.5	55.5		44.5	55.5		52.9	47.1		
Total %	7.7	9.6	17.4	8.7	10.8	19.5	33.4	29.7	63.1	

	Jefferson Avenue Southbound			Murrieta Hot Springs Road Westbound			Jefferson Avenue Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	68	67	135	69	60	129	268	**264**	**532**	796
04:45 PM	55	83	138	63	56	119	256	237	493	750
05:00 PM	**69**	65	134	69	110	179	259	231	490	803
05:15 PM	66	**89**	**155**	**78**	**142**	**220**	**287**	237	524	**899**
Total Volume	258	304	562	279	368	647	1070	969	2039	3248
% App. Total	45.9	54.1		43.1	56.9		52.5	47.5		
PHF	.935	.854	.906	.894	.648	.735	.932	.918	.958	.903

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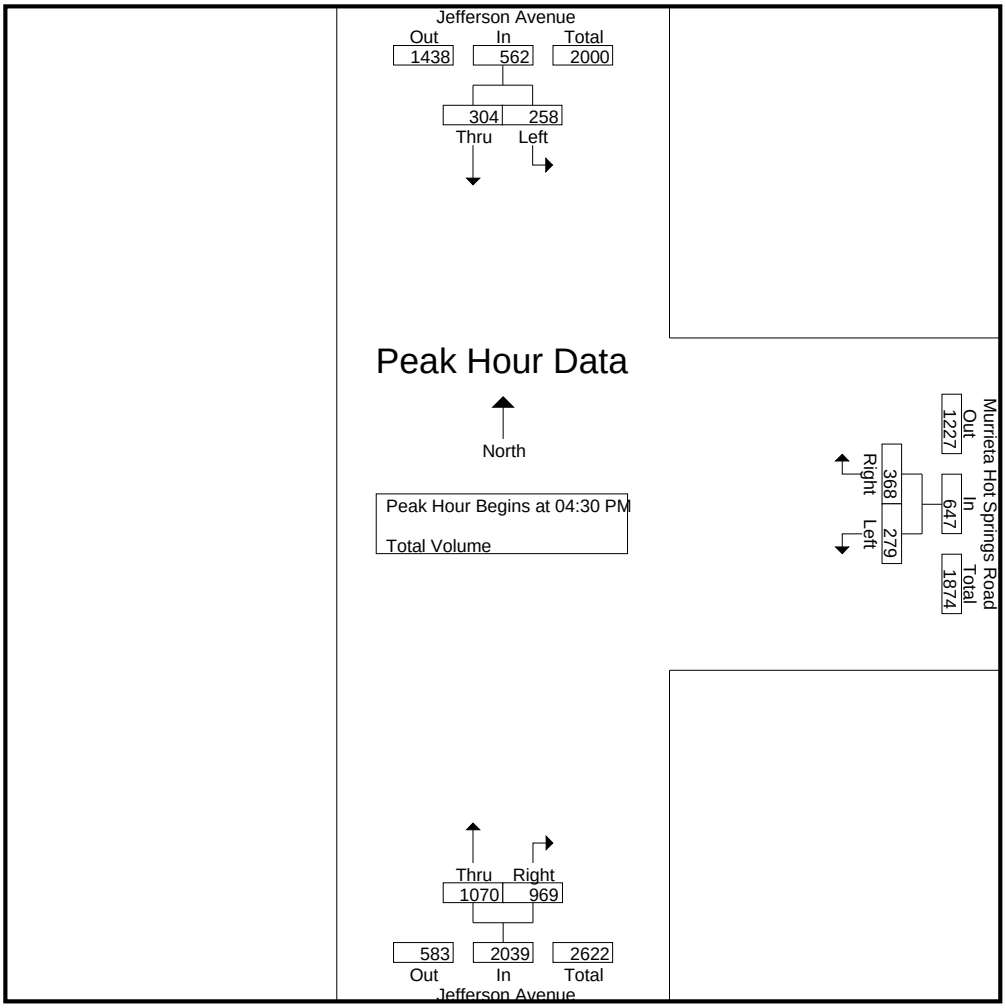
City of Murrieta
N/S: Jefferson Avenue
E/W: Murrieta Hot Springs Road
Weather: Clear

File Name : 01_MUR_Jefferson_MHS PM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM			05:00 PM			04:30 PM		
+0 mins.	55	83	138	69	110	179	268	**264**	**532**
+15 mins.	**69**	65	134	**78**	**142**	**220**	256	237	493
+30 mins.	66	**89**	**155**	58	90	148	259	231	490
+45 mins.	63	74	137	56	98	154	**287**	237	524
Total Volume	253	311	564	261	440	701	1070	969	2039
% App. Total	44.9	55.1		37.2	62.8		52.5	47.5	
PHF	.917	.874	.910	.837	.775	.797	.932	.918	.958

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City of Murrieta
N/S: Madison Street
E/W: Murrieta Hot Springs Road
Weather: Clear

File Name : 02_MUR_Madison_MHS AM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	Madison Street Southbound				Murrieta Hot Springs Road Westbound				Madison Street Northbound				Murrieta Hot Springs Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	24	25	13	62	53	139	27	219	0	15	32	47	11	55	0	66	394
07:15 AM	44	25	11	80	85	162	40	287	2	14	45	61	19	64	2	85	513
07:30 AM	68	28	26	122	97	156	38	291	4	13	41	58	18	56	7	81	552
07:45 AM	65	32	23	120	87	216	37	340	8	24	48	80	11	68	9	88	628
Total	201	110	73	384	322	673	142	1137	14	66	166	246	59	243	18	320	2087
08:00 AM	65	52	13	130	88	189	37	314	5	14	38	57	4	75	10	89	590
08:15 AM	51	34	17	102	104	159	58	321	5	17	62	84	17	84	13	114	621
08:30 AM	74	42	34	150	82	141	53	276	6	18	51	75	30	98	13	141	642
08:45 AM	88	45	25	158	143	126	76	345	4	29	56	89	19	86	23	128	720
Total	278	173	89	540	417	615	224	1256	20	78	207	305	70	343	59	472	2573
Grand Total	479	283	162	924	739	1288	366	2393	34	144	373	551	129	586	77	792	4660
Apprch %	51.8	30.6	17.5		30.9	53.8	15.3		6.2	26.1	67.7		16.3	74	9.7		
Total %	10.3	6.1	3.5	19.8	15.9	27.6	7.9	51.4	0.7	3.1	8	11.8	2.8	12.6	1.7	17	

	Madison Street Southbound				Murrieta Hot Springs Road Westbound				Madison Street Northbound				Murrieta Hot Springs Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	65	**52**	13	130	88	**189**	37	314	5	14	38	57	4	75	10	89	590
08:15 AM	51	34	17	102	104	159	58	321	5	17	**62**	84	17	84	13	114	621
08:30 AM	74	42	**34**	150	82	141	53	276	**6**	18	51	75	**30**	**98**	13	**141**	642
08:45 AM	**88**	45	25	**158**	**143**	126	**76**	**345**	4	**29**	56	**89**	19	86	**23**	128	**720**
Total Volume	278	173	89	540	417	615	224	1256	20	78	207	305	70	343	59	472	2573
% App. Total	51.5	32	16.5		33.2	49	17.8		6.6	25.6	67.9		14.8	72.7	12.5		
PHF	.790	.832	.654	.854	.729	.813	.737	.910	.833	.672	.835	.857	.583	.875	.641	.837	.893

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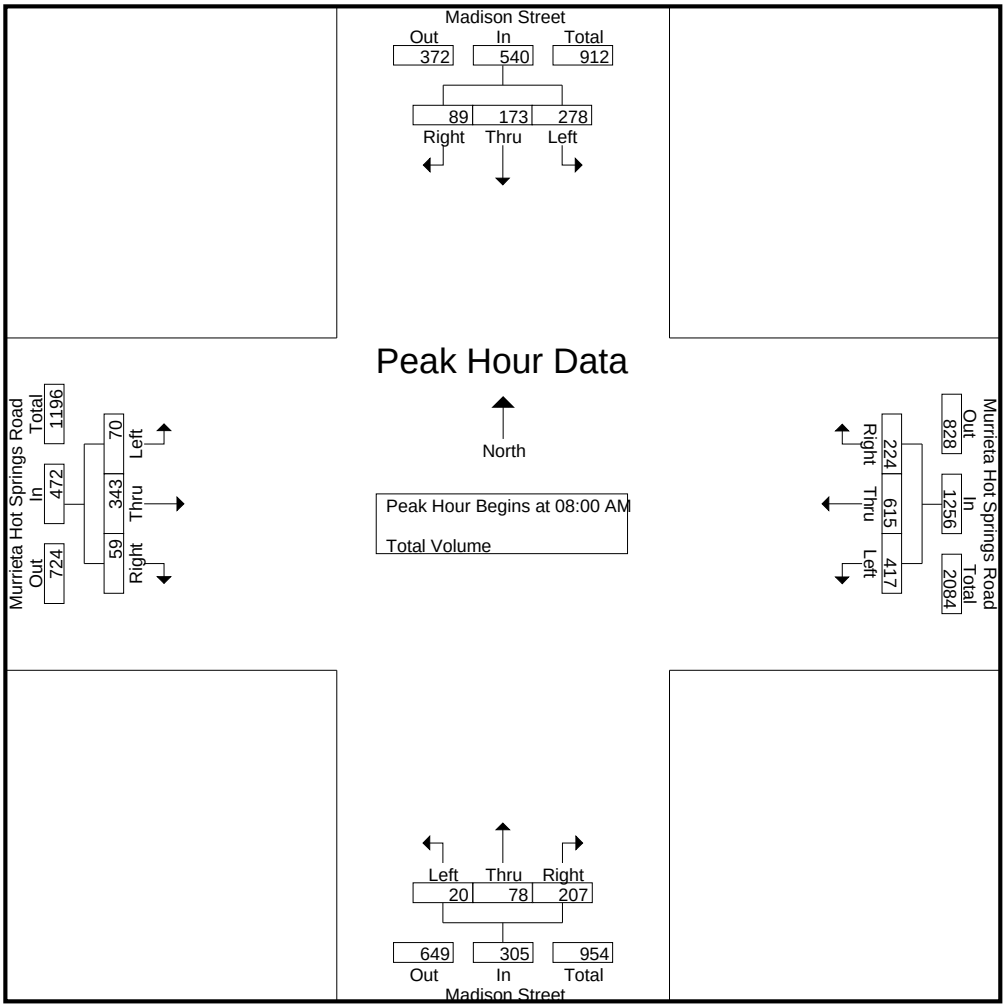
City of Murrieta
N/S: Madison Street
E/W: Murrieta Hot Springs Road
Weather: Clear

File Name : 02_MUR_Madison_MHS AM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	08:00 AM				07:30 AM				08:00 AM				08:00 AM			
+0 mins.	65	**52**	13	130	97	156	38	291	5	14	38	57	4	75	10	89
+15 mins.	51	34	17	102	87	**216**	37	**340**	5	17	**62**	84	17	84	13	114
+30 mins.	74	42	**34**	150	88	189	37	314	**6**	18	51	75	**30**	**98**	13	**141**
+45 mins.	**88**	45	25	**158**	**104**	159	**58**	321	4	**29**	56	**89**	19	86	**23**	128
Total Volume	278	173	89	540	376	720	170	1266	20	78	207	305	70	343	59	472
% App. Total	51.5	32	16.5		29.7	56.9	13.4		6.6	25.6	67.9		14.8	72.7	12.5	
PHF	.790	.832	.654	.854	.904	.833	.733	.931	.833	.672	.835	.857	.583	.875	.641	.837

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City of Murrieta
N/S: Madison Street
E/W: Murrieta Hot Springs Road
Weather: Clear

File Name : 02_MUR_Madison_MHS PM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	Madison Street Southbound				Murrieta Hot Springs Road Westbound				Madison Street Northbound				Murrieta Hot Springs Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	98	45	15	158	109	115	71	295	12	92	160	264	42	225	18	285	1002
04:15 PM	99	57	23	179	117	101	75	293	15	79	143	237	47	240	13	300	1009
04:30 PM	102	49	27	178	108	94	63	265	16	92	174	282	56	231	13	300	1025
04:45 PM	140	46	12	198	113	100	61	274	10	63	128	201	54	261	20	335	1008
Total	439	197	77	713	447	410	270	1127	53	326	605	984	199	957	64	1220	4044
05:00 PM	119	48	13	180	116	147	126	389	15	81	168	264	51	217	19	287	1120
05:15 PM	112	49	23	184	105	192	194	491	15	89	156	260	43	262	22	327	1262
05:30 PM	106	31	23	160	134	120	131	385	12	69	148	229	44	255	22	321	1095
05:45 PM	101	43	15	159	120	115	137	372	9	75	116	200	46	195	9	250	981
Total	438	171	74	683	475	574	588	1637	51	314	588	953	184	929	72	1185	4458
Grand Total	877	368	151	1396	922	984	858	2764	104	640	1193	1937	383	1886	136	2405	8502
Apprch %	62.8	26.4	10.8		33.4	35.6	31		5.4	33	61.6		15.9	78.4	5.7		
Total %	10.3	4.3	1.8	16.4	10.8	11.6	10.1	32.5	1.2	7.5	14	22.8	4.5	22.2	1.6	28.3	

	Madison Street Southbound				Murrieta Hot Springs Road Westbound				Madison Street Northbound				Murrieta Hot Springs Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	**140**	46	12	**198**	113	100	61	274	10	63	128	201	**54**	261	20	**335**	1008
05:00 PM	119	48	13	180	116	147	126	389	**15**	81	**168**	**264**	51	217	19	287	1120
05:15 PM	112	**49**	**23**	184	105	**192**	**194**	**491**	15	**89**	156	260	43	**262**	**22**	327	**1262**
05:30 PM	106	31	23	160	**134**	120	131	385	12	69	148	229	44	255	22	321	1095
Total Volume	477	174	71	722	468	559	512	1539	52	302	600	954	192	995	83	1270	4485
% App. Total	66.1	24.1	9.8		30.4	36.3	33.3		5.5	31.7	62.9		15.1	78.3	6.5		
PHF	.852	.888	.772	.912	.873	.728	.660	.784	.867	.848	.893	.903	.889	.949	.943	.948	.888

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City of Murrieta
N/S: Madison Street
E/W: Murrieta Hot Springs Road
Weather: Clear

File Name : 02_MUR_Madison_MHS PM
Site Code : 04218933
Start Date : 12/12/2018
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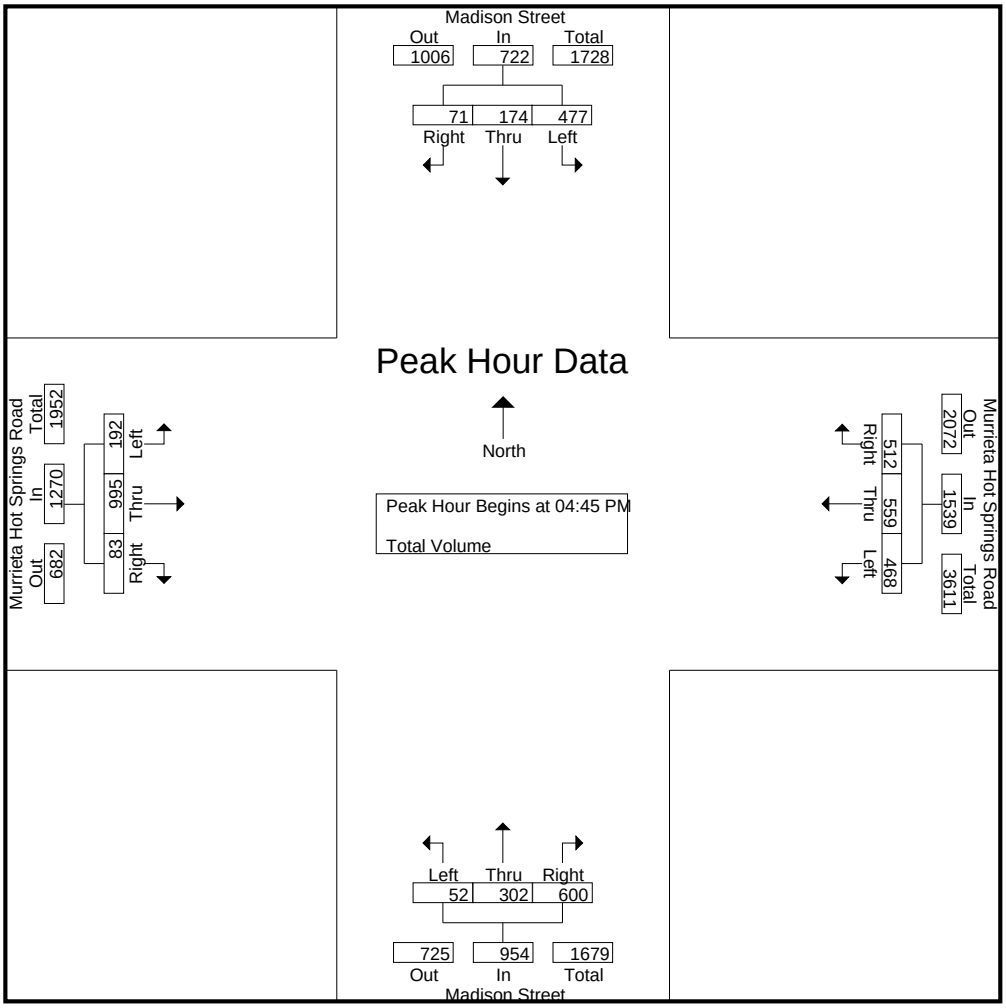

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				05:00 PM				04:30 PM				04:45 PM			
+0 mins.	102	**49**	**27**	178	116	147	126	389	**16**	**92**	**174**	**282**	**54**	261	20	**335**
+15 mins.	**140**	46	12	**198**	105	**192**	**194**	**491**	10	63	128	201	51	217	19	287
+30 mins.	119	48	13	180	**134**	120	131	385	15	81	168	264	43	**262**	**22**	327
+45 mins.	112	49	23	184	120	115	137	372	15	89	156	260	44	255	22	321
Total Volume	473	192	75	740	475	574	588	1637	56	325	626	1007	192	995	83	1270
% App. Total	63.9	25.9	10.1		29	35.1	35.9		5.6	32.3	62.2		15.1	78.3	6.5	
PHF	.845	.980	.694	.934	.886	.747	.758	.834	.875	.883	.899	.893	.889	.949	.943	.948

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County of Riverside
N/S: Menifee Road
E/W: Scott Road
Weather: Clear

File Name : 03_CRV_Menifee_Scott AM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	Menifee Road Southbound				Scott Road Westbound				Menifee Road Northbound				Scott Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	26	62	16	104	27	156	12	195	16	19	19	54	4	116	3	123	476
07:15 AM	28	63	22	113	39	143	22	204	29	19	32	80	15	100	15	130	527
07:30 AM	34	67	24	125	23	134	39	196	13	34	42	89	24	114	15	153	563
07:45 AM	34	96	20	150	24	123	49	196	20	38	33	91	19	98	13	130	567
Total	122	288	82	492	113	556	122	791	78	110	126	314	62	428	46	536	2133
08:00 AM	40	72	20	132	26	121	35	182	24	39	30	93	10	119	16	145	552
08:15 AM	25	78	23	126	27	135	39	201	19	77	13	109	18	87	25	130	566
08:30 AM	37	92	28	157	15	120	24	159	22	25	19	66	10	80	22	112	494
08:45 AM	21	45	19	85	19	126	11	156	19	22	19	60	18	97	20	135	436
Total	123	287	90	500	87	502	109	698	84	163	81	328	56	383	83	522	2048
Grand Total	245	575	172	992	200	1058	231	1489	162	273	207	642	118	811	129	1058	4181
Apprch %	24.7	58	17.3		13.4	71.1	15.5		25.2	42.5	32.2		11.2	76.7	12.2		
Total %	5.9	13.8	4.1	23.7	4.8	25.3	5.5	35.6	3.9	6.5	5	15.4	2.8	19.4	3.1	25.3	

	Menifee Road Southbound				Scott Road Westbound				Menifee Road Northbound				Scott Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	34	67	**24**	125	23	134	39	196	13	34	**42**	89	**24**	114	15	**153**	563
07:45 AM	34	**96**	20	**150**	24	123	**49**	196	20	38	33	91	19	98	13	130	**567**
08:00 AM	**40**	72	20	132	26	121	35	182	**24**	39	30	93	10	**119**	16	145	552
08:15 AM	25	78	23	126	**27**	**135**	39	**201**	19	**77**	13	**109**	18	87	**25**	130	566
Total Volume	133	313	87	533	100	513	162	775	76	188	118	382	71	418	69	558	2248
% App. Total	25	58.7	16.3		12.9	66.2	20.9		19.9	49.2	30.9		12.7	74.9	12.4		
PHF	.831	.815	.906	.888	.926	.950	.827	.964	.792	.610	.702	.876	.740	.878	.690	.912	.991

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County of Riverside
N/S: Menifee Road
E/W: Scott Road
Weather: Clear

File Name : 03_CRV_Menifee_Scott AM
Site Code : 04218933
Start Date : 12/12/2018
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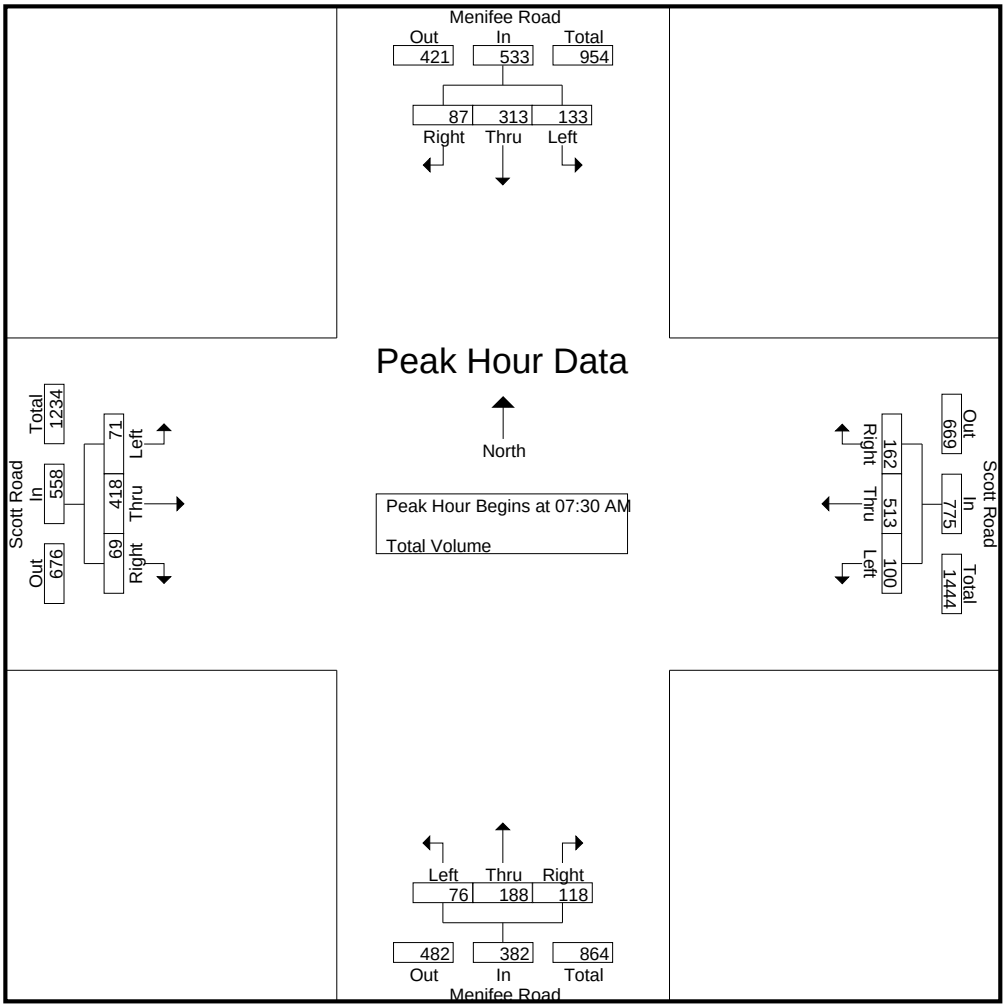

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:45 AM				07:00 AM				07:30 AM				07:15 AM			
+0 mins.	34	**96**	20	150	27	**156**	12	195	13	34	**42**	89	15	100	15	130
+15 mins.	**40**	72	20	132	**39**	143	22	**204**	20	38	33	91	**24**	114	15	**153**
+30 mins.	25	78	23	126	23	134	39	196	**24**	39	30	93	19	98	13	130
+45 mins.	37	92	**28**	**157**	24	123	**49**	196	19	**77**	13	**109**	10	**119**	**16**	145
Total Volume	136	338	91	565	113	556	122	791	76	188	118	382	68	431	59	558
% App. Total	24.1	59.8	16.1		14.3	70.3	15.4		19.9	49.2	30.9		12.2	77.2	10.6	
PHF	.850	.880	.813	.900	.724	.891	.622	.969	.792	.610	.702	.876	.708	.905	.922	.912

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County of Riverside
N/S: Menifee Road
E/W: Scott Road
Weather: Clear

File Name : 03_CRV_Menifee_Scott PM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	Menifee Road Southbound				Scott Road Westbound				Menifee Road Northbound				Scott Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	13	26	19	58	16	149	25	190	30	59	37	126	37	165	30	232	606
04:15 PM	24	25	12	61	26	152	25	203	33	71	36	140	34	143	25	202	606
04:30 PM	25	31	18	74	22	137	22	181	21	84	38	143	47	129	22	198	596
04:45 PM	15	26	19	60	15	151	30	196	27	98	25	150	49	151	21	221	627
Total	77	108	68	253	79	589	102	770	111	312	136	559	167	588	98	853	2435
05:00 PM	28	36	12	76	13	164	25	202	32	93	37	162	28	156	34	218	658
05:15 PM	28	37	16	81	20	156	24	200	25	108	39	172	43	143	26	212	665
05:30 PM	20	27	20	67	16	168	26	210	24	73	41	138	42	151	35	228	643
05:45 PM	17	26	16	59	13	135	21	169	32	99	44	175	44	131	31	206	609
Total	93	126	64	283	62	623	96	781	113	373	161	647	157	581	126	864	2575
Grand Total	170	234	132	536	141	1212	198	1551	224	685	297	1206	324	1169	224	1717	5010
Apprch %	31.7	43.7	24.6		9.1	78.1	12.8		18.6	56.8	24.6		18.9	68.1	13		
Total %	3.4	4.7	2.6	10.7	2.8	24.2	4	31	4.5	13.7	5.9	24.1	6.5	23.3	4.5	34.3	

	Menifee Road Southbound				Scott Road Westbound				Menifee Road Northbound				Scott Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	15	26	19	60	15	151	**30**	196	27	98	25	150	**49**	151	21	221	627
05:00 PM	**28**	36	12	76	13	164	25	202	**32**	93	37	162	28	**156**	34	218	658
05:15 PM	28	**37**	16	**81**	**20**	156	24	200	25	**108**	39	**172**	43	143	26	212	**665**
05:30 PM	20	27	**20**	67	16	**168**	26	**210**	24	73	**41**	138	42	151	**35**	**228**	643
Total Volume	91	126	67	284	64	639	105	808	108	372	142	622	162	601	116	879	2593
% App. Total	32	44.4	23.6		7.9	79.1	13		17.4	59.8	22.8		18.4	68.4	13.2		
PHF	.813	.851	.838	.877	.800	.951	.875	.962	.844	.861	.866	.904	.827	.963	.829	.964	.975

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County of Riverside
N/S: Menifee Road
E/W: Scott Road
Weather: Clear

File Name : 03_CRV_Menifee_Scott PM
Site Code : 04218933
Start Date : 12/12/2018
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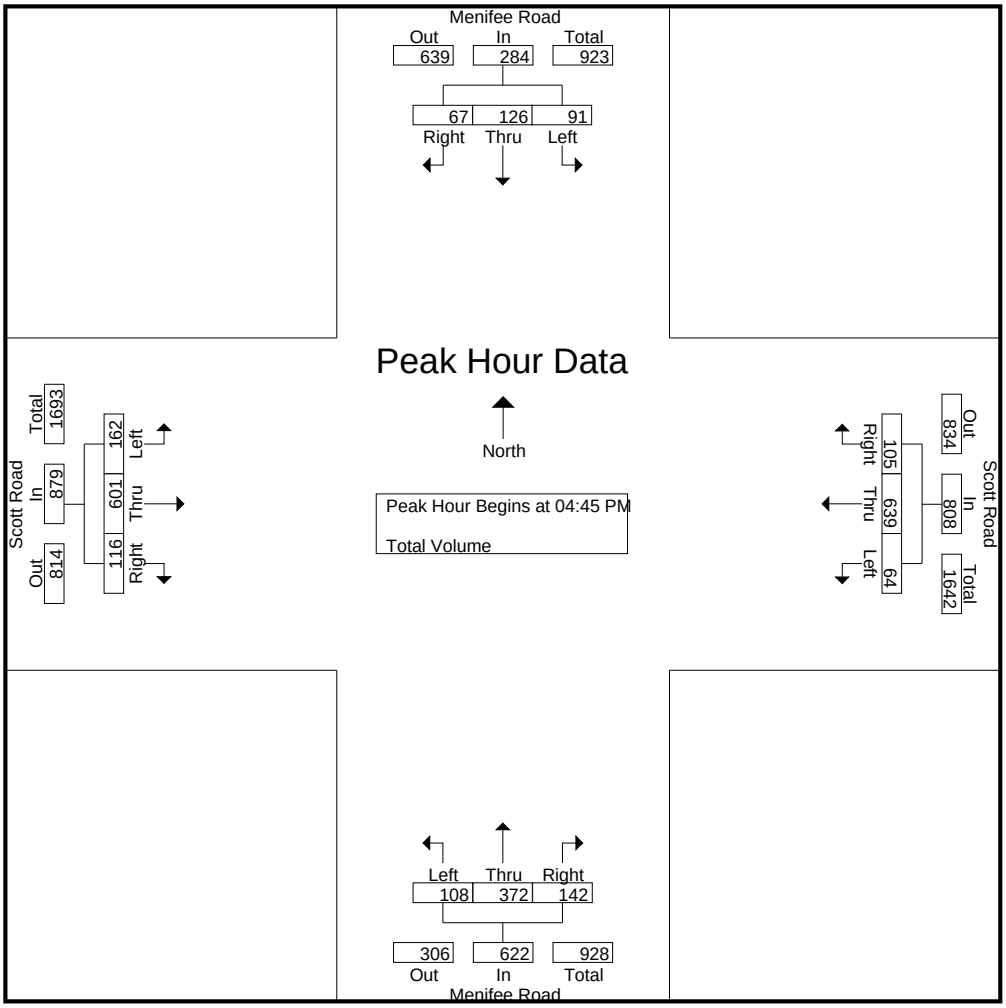

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:45 PM				05:00 PM				04:45 PM			
+0 mins.	25	31	18	74	15	151	**30**	196	**32**	93	37	162	**49**	151	21	221
+15 mins.	15	26	**19**	60	13	164	25	202	25	**108**	39	172	28	**156**	34	218
+30 mins.	**28**	36	12	76	**20**	156	24	200	24	73	41	138	43	143	26	212
+45 mins.	28	**37**	16	**81**	16	**168**	26	**210**	32	99	**44**	**175**	42	151	**35**	**228**
Total Volume	96	130	65	291	64	639	105	808	113	373	161	647	162	601	116	879
% App. Total	33	44.7	22.3		7.9	79.1	13		17.5	57.7	24.9		18.4	68.4	13.2	
PHF	.857	.878	.855	.898	.800	.951	.875	.962	.883	.863	.915	.924	.827	.963	.829	.964

Counts Unlimited
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County of Riverside
N/S: Winchester Road (SR-79)
E/W: Scott Road/Washington Street
Weather: Clear

File Name : 04_CRV_Winchester_Scott_Washington AM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	Winchester Road Southbound				Washington Street Westbound				Winchester Road Northbound				Scott Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	60	200	30	290	0	16	38	54	26	147	0	173	38	38	29	105	622
07:15 AM	58	305	33	396	0	21	53	74	22	171	0	193	43	19	23	85	748
07:30 AM	47	307	39	393	0	15	44	59	20	157	0	177	45	18	24	87	716
07:45 AM	75	263	49	387	1	19	36	56	20	137	1	158	26	18	18	62	663
Total	240	1075	151	1466	1	71	171	243	88	612	1	701	152	93	94	339	2749
08:00 AM	60	196	43	299	1	19	30	50	19	105	2	126	26	17	11	54	529
08:15 AM	39	205	41	285	0	8	25	33	11	120	0	131	22	12	14	48	497
08:30 AM	45	191	31	267	1	12	30	43	17	113	2	132	29	19	10	58	500
08:45 AM	35	185	29	249	1	13	31	45	12	114	0	126	24	15	7	46	466
Total	179	777	144	1100	3	52	116	171	59	452	4	515	101	63	42	206	1992
Grand Total	419	1852	295	2566	4	123	287	414	147	1064	5	1216	253	156	136	545	4741
Apprch %	16.3	72.2	11.5		1	29.7	69.3		12.1	87.5	0.4		46.4	28.6	25		
Total %	8.8	39.1	6.2	54.1	0.1	2.6	6.1	8.7	3.1	22.4	0.1	25.6	5.3	3.3	2.9	11.5	

	Winchester Road Southbound				Washington Street Westbound				Winchester Road Northbound				Scott Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	60	200	30	290	0	16	38	54	**26**	147	0	173	38	**38**	**29**	**105**	622
07:15 AM	58	305	33	**396**	0	**21**	**53**	**74**	22	**171**	0	**193**	43	19	23	85	**748**
07:30 AM	47	**307**	39	393	0	15	44	59	20	157	0	177	**45**	18	24	87	716
07:45 AM	**75**	263	**49**	387	**1**	19	36	56	20	137	**1**	158	26	18	18	62	663
Total Volume	240	1075	151	1466	1	71	171	243	88	612	1	701	152	93	94	339	2749
% App. Total	16.4	73.3	10.3		0.4	29.2	70.4		12.6	87.3	0.1		44.8	27.4	27.7		
PHF	.800	.875	.770	.926	.250	.845	.807	.821	.846	.895	.250	.908	.844	.612	.810	.807	.919

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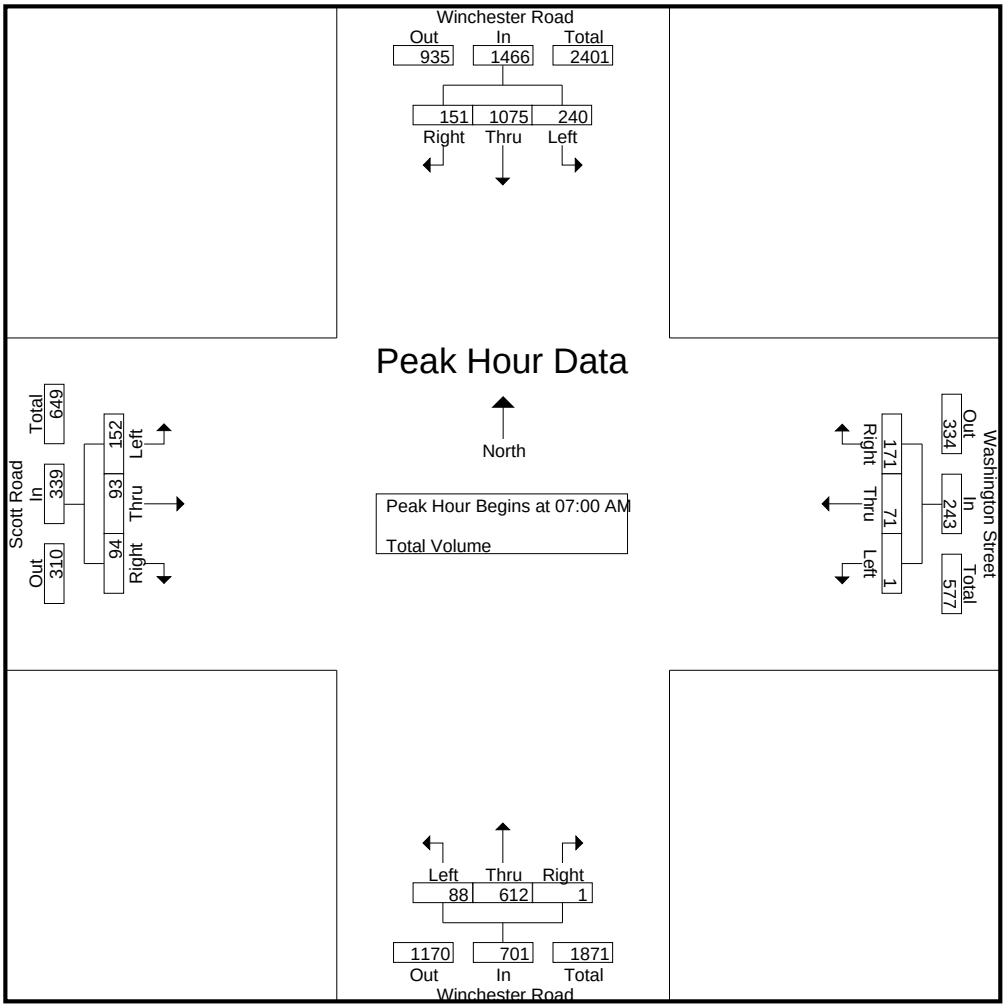
County of Riverside
N/S: Winchester Road (SR-79)
E/W: Scott Road/Washington Street
Weather: Clear

File Name : 04_CRV_Winchester_Scott_Washington AM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:15 AM				07:00 AM				07:00 AM				07:00 AM			
+0 mins.	58	305	33	**396**	0	16	38	54	**26**	147	0	173	38	**38**	**29**	**105**
+15 mins.	47	**307**	39	393	0	**21**	**53**	**74**	22	**171**	0	**193**	43	19	23	85
+30 mins.	**75**	263	**49**	387	0	15	44	59	20	157	0	177	**45**	18	24	87
+45 mins.	60	196	43	299	**1**	19	36	56	20	137	**1**	158	26	18	18	62
Total Volume	240	1071	164	1475	1	71	171	243	88	612	1	701	152	93	94	339
% App. Total	16.3	72.6	11.1		0.4	29.2	70.4		12.6	87.3	0.1		44.8	27.4	27.7	
PHF	.800	.872	.837	.931	.250	.845	.807	.821	.846	.895	.250	.908	.844	.612	.810	.807

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County of Riverside
N/S: Winchester Road (SR-79)
E/W: Scott Road/Washington Street
Weather: Clear

File Name : 04_CRV_Winchester_Scott_Washington PM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	Winchester Road Southbound				Washington Street Westbound				Winchester Road Northbound				Scott Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	56	172	28	256	1	38	92	131	20	244	0	264	61	18	15	94	745
04:15 PM	59	182	45	286	1	35	88	124	19	249	1	269	61	26	14	101	780
04:30 PM	64	226	28	318	0	29	101	130	10	357	0	367	40	23	10	73	888
04:45 PM	54	188	19	261	1	32	115	148	25	257	0	282	58	16	13	87	778
Total	233	768	120	1121	3	134	396	533	74	1107	1	1182	220	83	52	355	3191
05:00 PM	38	168	30	236	0	35	106	141	15	248	0	263	47	15	13	75	715
05:15 PM	49	257	28	334	0	33	117	150	22	285	1	308	39	13	11	63	855
05:30 PM	57	176	46	279	0	32	108	140	15	253	2	270	68	25	19	112	801
05:45 PM	30	174	28	232	0	20	95	115	14	296	0	310	47	18	16	81	738
Total	174	775	132	1081	0	120	426	546	66	1082	3	1151	201	71	59	331	3109
Grand Total	407	1543	252	2202	3	254	822	1079	140	2189	4	2333	421	154	111	686	6300
Apprch %	18.5	70.1	11.4		0.3	23.5	76.2		6	93.8	0.2		61.4	22.4	16.2		
Total %	6.5	24.5	4	35	0	4	13	17.1	2.2	34.7	0.1	37	6.7	2.4	1.8	10.9	

	Winchester Road Southbound				Washington Street Westbound				Winchester Road Northbound				Scott Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	**64**	226	28	318	0	29	101	130	10	**357**	0	**367**	40	**23**	10	73	**888**
04:45 PM	54	188	19	261	**1**	32	115	148	**25**	257	0	282	**58**	16	**13**	**87**	778
05:00 PM	38	168	**30**	236	0	**35**	106	141	15	248	0	263	47	15	13	75	715
05:15 PM	49	**257**	28	**334**	0	33	**117**	**150**	22	285	**1**	308	39	13	11	63	855
Total Volume	205	839	105	1149	1	129	439	569	72	1147	1	1220	184	67	47	298	3236
% App. Total	17.8	73	9.1		0.2	22.7	77.2		5.9	94	0.1		61.7	22.5	15.8		
PHF	.801	.816	.875	.860	.250	.921	.938	.948	.720	.803	.250	.831	.793	.728	.904	.856	.911

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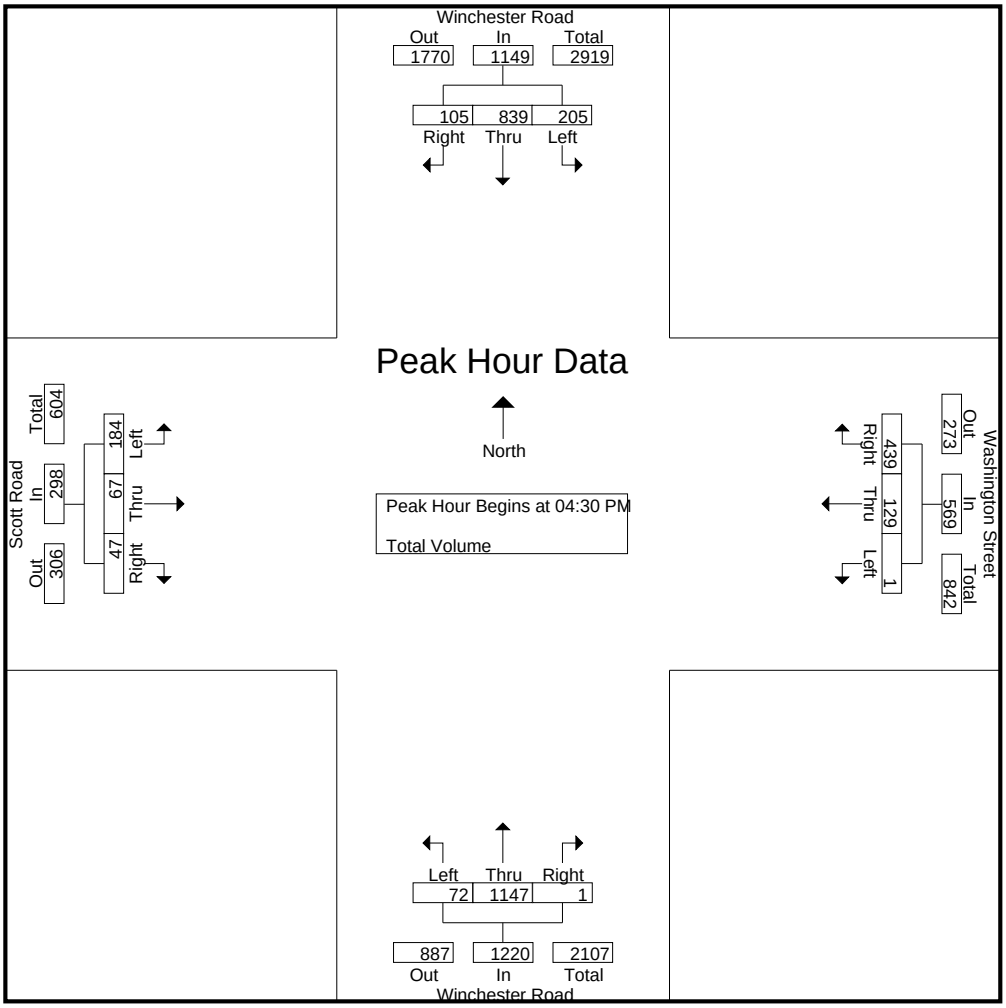
County of Riverside
N/S: Winchester Road (SR-79)
E/W: Scott Road/Washington Street
Weather: Clear

File Name : 04_CRV_Winchester_Scott_Washington PM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:45 PM				04:30 PM				04:00 PM			
+0 mins.	**64**	226	28	318	**1**	32	115	148	10	**357**	0	**367**	**61**	18	**15**	94
+15 mins.	54	188	19	261	0	**35**	106	141	**25**	257	0	282	61	**26**	14	**101**
+30 mins.	38	168	**30**	236	0	33	**117**	**150**	15	248	0	263	40	23	10	73
+45 mins.	49	**257**	28	**334**	0	32	108	140	22	285	**1**	308	58	16	13	87
Total Volume	205	839	105	1149	1	132	446	579	72	1147	1	1220	220	83	52	355
% App. Total	17.8	73	9.1		0.2	22.8	77		5.9	94	0.1		62	23.4	14.6	
PHF	.801	.816	.875	.860	.250	.943	.953	.965	.720	.803	.250	.831	.902	.798	.867	.879

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City of Murrieta
N/S: Antelope Road
E/W: Keller Road
Weather: Clear

File Name : 05_MUR_Antelope_Keller AM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	Antelope Road Southbound				Keller Road Westbound				Antelope Road Northbound				Keller Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	5	45	1	51	16	57	5	78	4	14	3	21	1	10	10	21	171
07:15 AM	6	58	4	68	19	59	11	89	9	22	6	37	1	24	9	34	228
07:30 AM	4	61	5	70	24	35	12	71	5	29	8	42	2	24	11	37	220
07:45 AM	15	85	3	103	6	23	11	40	3	31	14	48	1	25	16	42	233
Total	30	249	13	292	65	174	39	278	21	96	31	148	5	83	46	134	852
08:00 AM	14	72	1	87	18	14	14	46	4	16	13	33	1	22	11	34	200
08:15 AM	17	58	3	78	9	11	13	33	2	19	14	35	2	16	11	29	175
08:30 AM	29	65	3	97	12	9	7	28	5	28	11	44	1	8	20	29	198
08:45 AM	27	66	1	94	11	7	6	24	5	29	9	43	2	11	8	21	182
Total	87	261	8	356	50	41	40	131	16	92	47	155	6	57	50	113	755
Grand Total	117	510	21	648	115	215	79	409	37	188	78	303	11	140	96	247	1607
Apprch %	18.1	78.7	3.2		28.1	52.6	19.3		12.2	62	25.7		4.5	56.7	38.9		
Total %	7.3	31.7	1.3	40.3	7.2	13.4	4.9	25.5	2.3	11.7	4.9	18.9	0.7	8.7	6	15.4	

	Antelope Road Southbound				Keller Road Westbound				Antelope Road Northbound				Keller Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	6	58	4	68	19	**59**	11	**89**	**9**	22	6	37	1	24	9	34	228
07:30 AM	4	61	**5**	70	**24**	35	12	71	5	29	8	42	**2**	24	11	37	220
07:45 AM	**15**	**85**	3	**103**	6	23	11	40	3	**31**	**14**	**48**	1	**25**	**16**	**42**	**233**
08:00 AM	14	72	1	87	18	14	**14**	46	4	16	13	33	1	22	11	34	200
Total Volume	39	276	13	328	67	131	48	246	21	98	41	160	5	95	47	147	881
% App. Total	11.9	84.1	4		27.2	53.3	19.5		13.1	61.2	25.6		3.4	64.6	32		
PHF	.650	.812	.650	.796	.698	.555	.857	.691	.583	.790	.732	.833	.625	.950	.734	.875	.945

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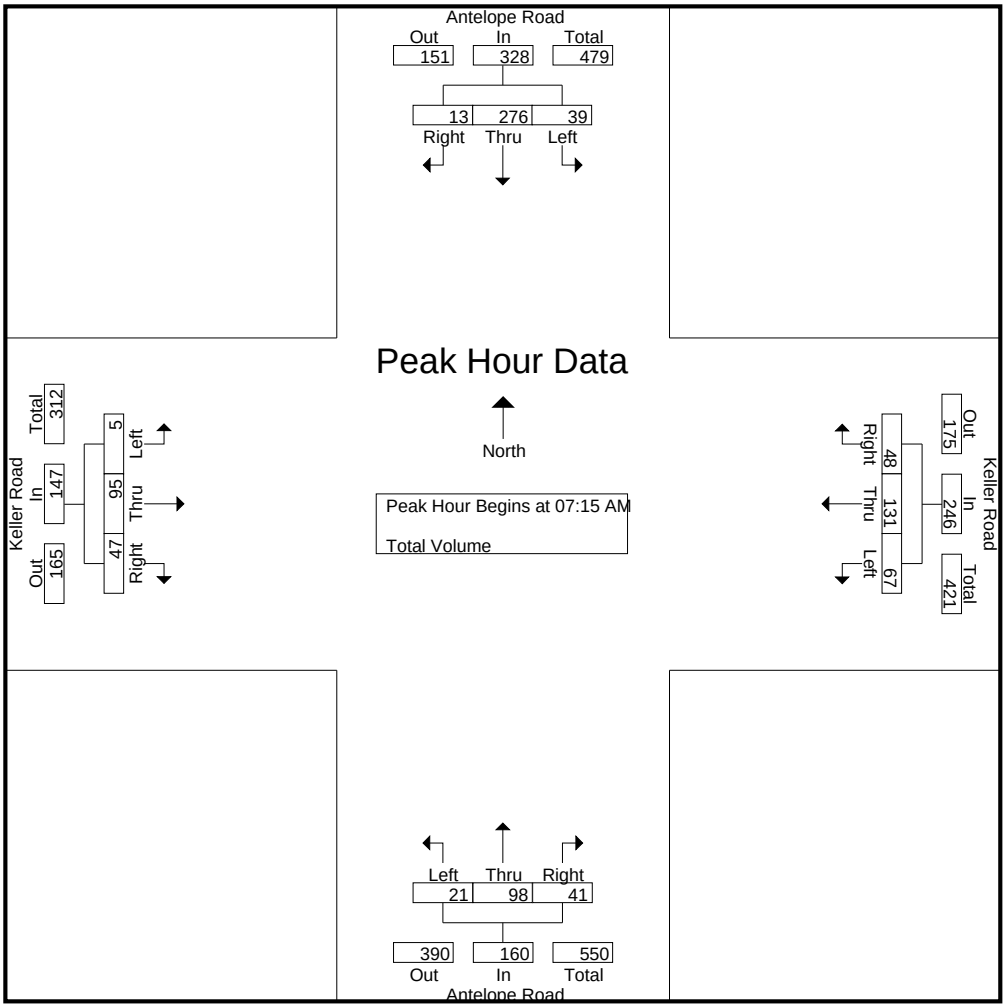
City of Murrieta
N/S: Antelope Road
E/W: Keller Road
Weather: Clear

File Name : 05_MUR_Antelope_Keller AM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:45 AM				07:00 AM				07:15 AM				07:15 AM			
+0 mins.	15	**85**	**3**	**103**	16	57	5	78	**9**	22	6	37	1	24	9	34
+15 mins.	14	72	1	87	19	**59**	11	**89**	5	29	8	42	**2**	24	11	37
+30 mins.	17	58	3	78	**24**	35	**12**	71	3	**31**	**14**	**48**	1	**25**	**16**	**42**
+45 mins.	**29**	65	3	97	6	23	11	40	4	16	13	33	1	22	11	34
Total Volume	75	280	10	365	65	174	39	278	21	98	41	160	5	95	47	147
% App. Total	20.5	76.7	2.7		23.4	62.6	14		13.1	61.2	25.6		3.4	64.6	32	
PHF	.647	.824	.833	.886	.677	.737	.813	.781	.583	.790	.732	.833	.625	.950	.734	.875

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City of Murrieta
N/S: Antelope Road
E/W: Keller Road
Weather: Clear

File Name : 05_MUR_Antelope_Keller PM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	Antelope Road Southbound				Keller Road Westbound				Antelope Road Northbound				Keller Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	18	46	4	68	13	20	22	55	20	74	16	110	5	17	5	27	260
04:15 PM	18	36	3	57	10	33	25	68	32	70	18	120	2	16	6	24	269
04:30 PM	16	32	4	52	23	24	25	72	29	86	14	129	4	15	5	24	277
04:45 PM	16	45	3	64	21	32	31	84	29	99	8	136	3	9	7	19	303
Total	68	159	14	241	67	109	103	279	110	329	56	495	14	57	23	94	1109
05:00 PM	14	32	2	48	19	25	25	69	34	85	12	131	1	21	11	33	281
05:15 PM	20	38	1	59	16	38	20	74	40	93	21	154	2	19	6	27	314
05:30 PM	20	25	3	48	16	22	26	64	25	74	19	118	5	14	3	22	252
05:45 PM	21	39	6	66	18	19	15	52	23	93	16	132	1	18	3	22	272
Total	75	134	12	221	69	104	86	259	122	345	68	535	9	72	23	104	1119
Grand Total	143	293	26	462	136	213	189	538	232	674	124	1030	23	129	46	198	2228
Apprch %	31	63.4	5.6		25.3	39.6	35.1		22.5	65.4	12		11.6	65.2	23.2		
Total %	6.4	13.2	1.2	20.7	6.1	9.6	8.5	24.1	10.4	30.3	5.6	46.2	1	5.8	2.1	8.9	

	Antelope Road Southbound				Keller Road Westbound				Antelope Road Northbound				Keller Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	16	32	**4**	52	**23**	24	25	72	29	86	14	129	**4**	15	5	24	277
04:45 PM	16	**45**	3	**64**	21	32	**31**	**84**	29	**99**	8	136	3	9	7	19	303
05:00 PM	14	32	2	48	19	25	25	69	34	85	12	131	1	**21**	**11**	**33**	281
05:15 PM	**20**	38	1	59	16	**38**	20	74	**40**	93	**21**	**154**	2	19	6	27	**314**
Total Volume	66	147	10	223	79	119	101	299	132	363	55	550	10	64	29	103	1175
% App. Total	29.6	65.9	4.5		26.4	39.8	33.8		24	66	10		9.7	62.1	28.2		
PHF	.825	.817	.625	.871	.859	.783	.815	.890	.825	.917	.655	.893	.625	.762	.659	.780	.936

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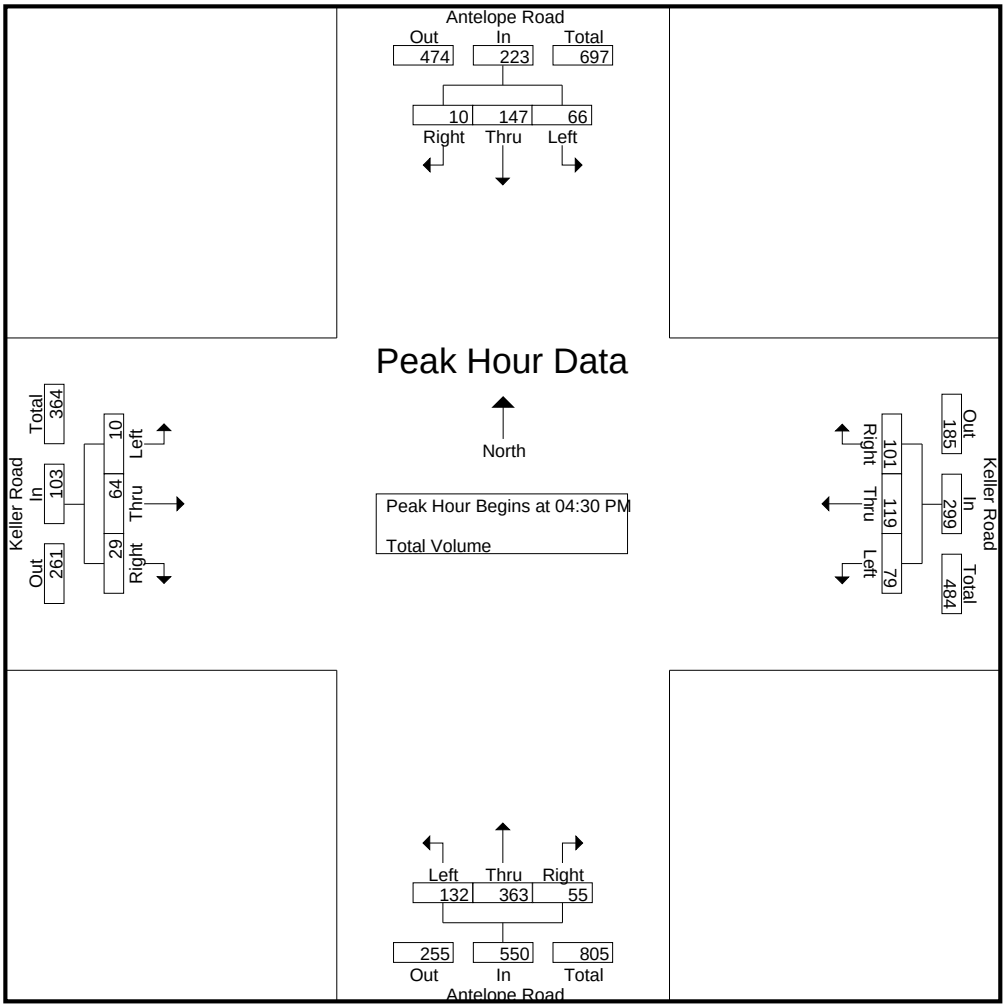
City of Murrieta
N/S: Antelope Road
E/W: Keller Road
Weather: Clear

File Name : 05_MUR_Antelope_Keller PM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				04:30 PM				04:30 PM				05:00 PM			
+0 mins.	**18**	**46**	**4**	**68**	**23**	24	25	72	29	86	14	129	1	**21**	**11**	**33**
+15 mins.	18	36	3	57	21	32	**31**	**84**	29	**99**	8	136	2	19	6	27
+30 mins.	16	32	4	52	19	25	25	69	34	85	12	131	**5**	14	3	22
+45 mins.	16	45	3	64	16	**38**	20	74	**40**	93	**21**	**154**	1	18	3	22
Total Volume	68	159	14	241	79	119	101	299	132	363	55	550	9	72	23	104
% App. Total	28.2	66	5.8		26.4	39.8	33.8		24	66	10		8.7	69.2	22.1	
PHF	.944	.864	.875	.886	.859	.783	.815	.890	.825	.917	.655	.893	.450	.857	.523	.788

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City of Murrieta
N/S: Antelope Road
E/W: Baxter Road
Weather: Clear

File Name : 06_MUR_Antelope_Baxter AM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	Antelope Road Southbound			Baxter Road Westbound			Antelope Road Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
07:00 AM	28	38	66	4	13	17	13	8	21	104
07:15 AM	28	64	92	7	16	23	16	15	31	146
07:30 AM	37	59	96	3	24	27	19	12	31	154
07:45 AM	60	54	114	7	22	29	26	21	47	190
Total	153	215	368	21	75	96	74	56	130	594
08:00 AM	49	54	103	6	17	23	20	17	37	163
08:15 AM	39	42	81	5	14	19	14	10	24	124
08:30 AM	47	50	97	4	22	26	22	14	36	159
08:45 AM	35	45	80	6	26	32	18	8	26	138
Total	170	191	361	21	79	100	74	49	123	584
Grand Total	323	406	729	42	154	196	148	105	253	1178
Apprch %	44.3	55.7		21.4	78.6		58.5	41.5		
Total %	27.4	34.5	61.9	3.6	13.1	16.6	12.6	8.9	21.5	

	Antelope Road Southbound			Baxter Road Westbound			Antelope Road Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:15 AM										
07:15 AM	28	**64**	92	**7**	16	23	16	15	31	146
07:30 AM	37	59	96	3	**24**	27	19	12	31	154
07:45 AM	**60**	54	**114**	7	22	**29**	**26**	**21**	**47**	**190**
08:00 AM	49	54	103	6	17	23	20	17	37	163
Total Volume	174	231	405	23	79	102	81	65	146	653
% App. Total	43	57		22.5	77.5		55.5	44.5		
PHF	.725	.902	.888	.821	.823	.879	.779	.774	.777	.859

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City of Murrieta
N/S: Antelope Road
E/W: Baxter Road
Weather: Clear

File Name : 06_MUR_Antelope_Baxter AM
Site Code : 04218933
Start Date : 12/12/2018
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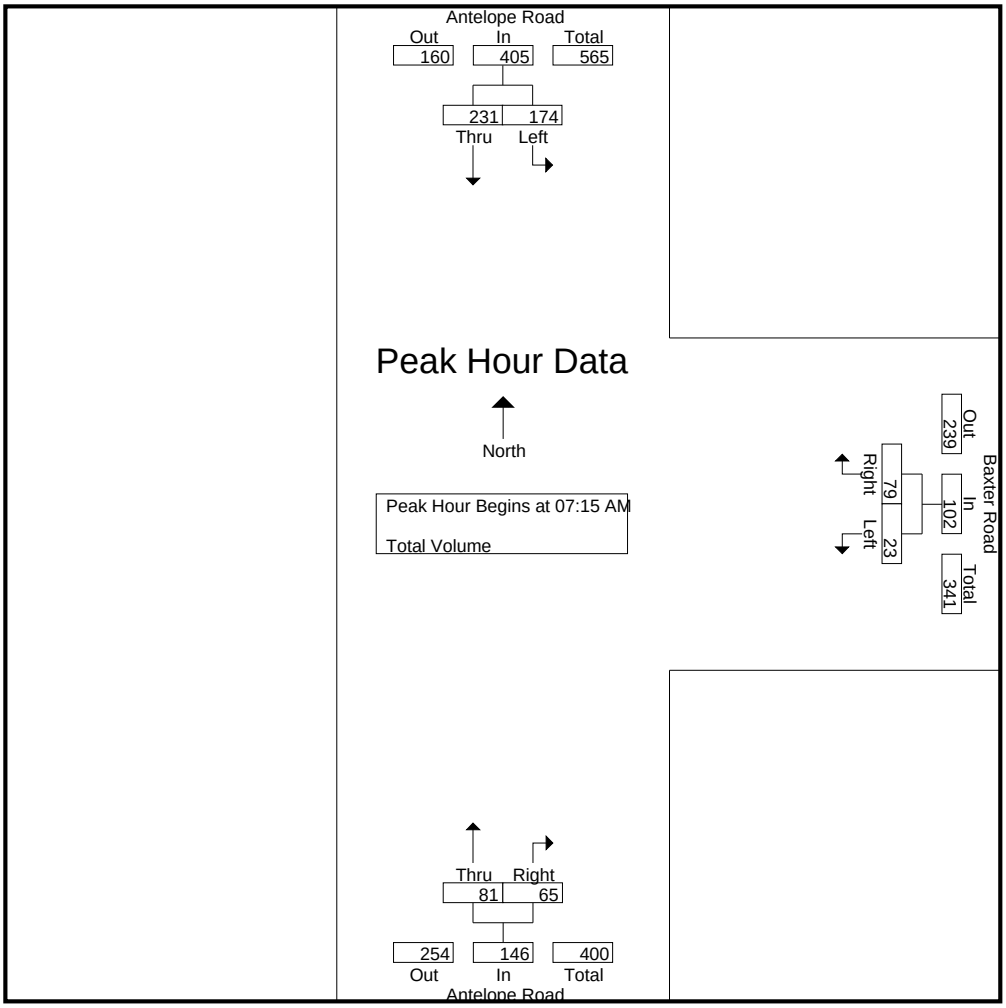

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:15 AM			07:15 AM			07:15 AM		
+0 mins.	28	**64**	92	**7**	16	23	16	15	31
+15 mins.	37	59	96	3	**24**	27	19	12	31
+30 mins.	**60**	54	**114**	7	22	**29**	**26**	**21**	**47**
+45 mins.	49	54	103	6	17	23	20	17	37
Total Volume	174	231	405	23	79	102	81	65	146
% App. Total	43	57		22.5	77.5		55.5	44.5	
PHF	.725	.902	.888	.821	.823	.879	.779	.774	.777

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City of Murrieta
N/S: Antelope Road
E/W: Baxter Road
Weather: Clear

File Name : 06_MUR_Antelope_Baxter PM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	Antelope Road Southbound			Baxter Road Westbound			Antelope Road Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
04:00 PM	21	49	70	11	52	63	58	7	65	198
04:15 PM	19	34	53	11	56	67	67	5	72	192
04:30 PM	21	38	59	11	70	81	60	3	63	203
04:45 PM	20	52	72	11	65	76	61	5	66	214
Total	81	173	254	44	243	287	246	20	266	807
05:00 PM	26	35	61	17	65	82	73	2	75	218
05:15 PM	10	36	46	14	51	65	72	3	75	186
05:30 PM	19	23	42	15	43	58	83	2	85	185
05:45 PM	19	24	43	7	32	39	57	5	62	144
Total	74	118	192	53	191	244	285	12	297	733
Grand Total	155	291	446	97	434	531	531	32	563	1540
Apprch %	34.8	65.2		18.3	81.7		94.3	5.7		
Total %	10.1	18.9	29	6.3	28.2	34.5	34.5	2.1	36.6	

	Antelope Road Southbound			Baxter Road Westbound			Antelope Road Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:15 PM										
04:15 PM	19	34	53	11	56	67	67	**5**	72	192
04:30 PM	21	38	59	11	**70**	81	60	3	63	203
04:45 PM	20	**52**	**72**	11	65	76	61	5	66	214
05:00 PM	**26**	35	61	**17**	65	**82**	**73**	2	**75**	**218**
Total Volume	86	159	245	50	256	306	261	15	276	827
% App. Total	35.1	64.9		16.3	83.7		94.6	5.4		
PHF	.827	.764	.851	.735	.914	.933	.894	.750	.920	.948

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City of Murrieta
N/S: Antelope Road
E/W: Baxter Road
Weather: Clear

File Name : 06_MUR_Antelope_Baxter PM
Site Code : 04218933
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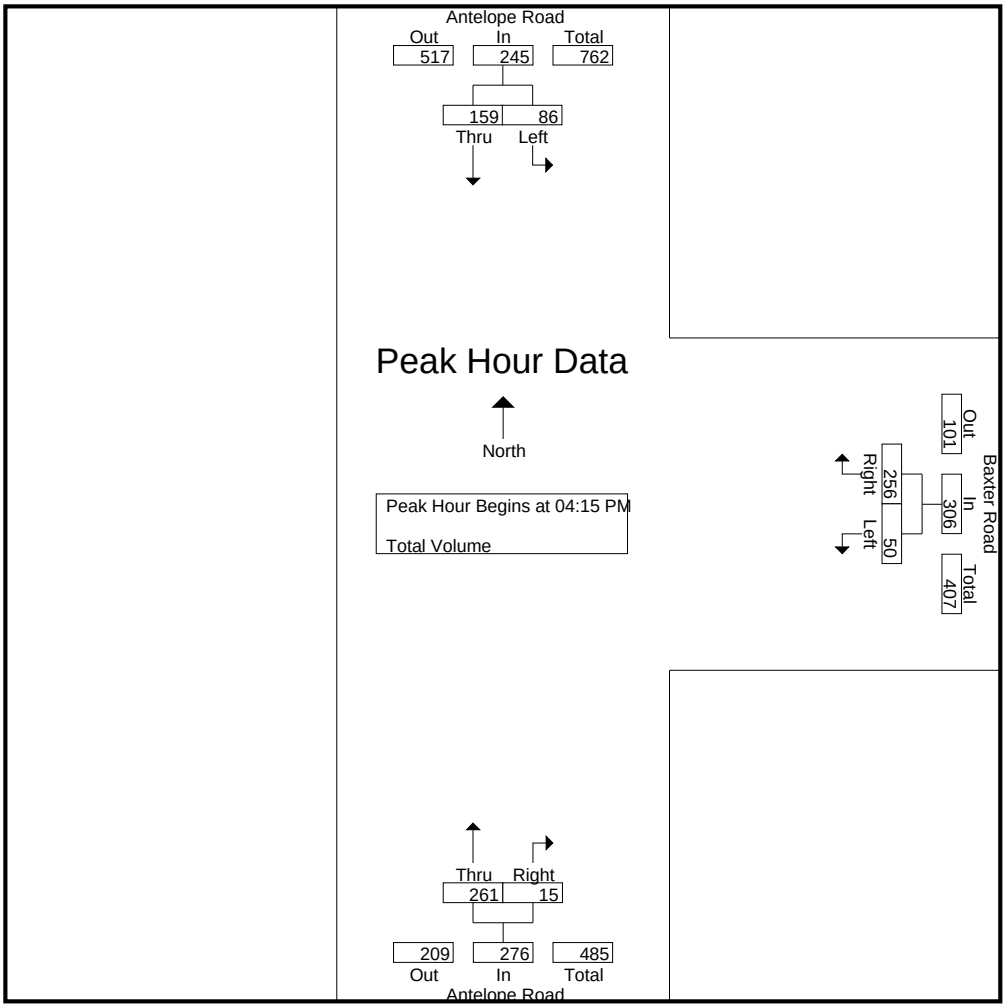

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM			04:15 PM			04:45 PM		
+0 mins.	**21**	49	70	11	56	67	61	**5**	66
+15 mins.	19	34	53	11	**70**	81	73	2	75
+30 mins.	21	38	59	11	65	76	72	3	75
+45 mins.	20	**52**	**72**	**17**	65	**82**	**83**	2	**85**
Total Volume	81	173	254	50	256	306	289	12	301
% App. Total	31.9	68.1		16.3	83.7		96	4	
PHF	.964	.832	.882	.735	.914	.933	.870	.600	.885

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City of Murrieta
N/S: California Oaks Road
E/W: Clinton Keith Road
Weather: Clear

File Name : 07_MUR_Cal Oaks_Clinton Keith AM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	Clinton Keith Road Westbound			California Oaks Road Northbound			Clinton Keith Road Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
07:00 AM	111	208	319	13	94	107	291	26	317	743
07:15 AM	169	219	388	28	82	110	224	29	253	751
07:30 AM	153	198	351	35	113	148	253	25	278	777
07:45 AM	125	200	325	28	121	149	222	34	256	730
Total	558	825	1383	104	410	514	990	114	1104	3001
08:00 AM	120	203	323	38	103	141	222	36	258	722
08:15 AM	173	254	427	30	94	124	203	39	242	793
08:30 AM	148	224	372	25	92	117	206	37	243	732
08:45 AM	129	171	300	24	100	124	183	26	209	633
Total	570	852	1422	117	389	506	814	138	952	2880
Grand Total	1128	1677	2805	221	799	1020	1804	252	2056	5881
Apprch %	40.2	59.8		21.7	78.3		87.7	12.3		
Total %	19.2	28.5	47.7	3.8	13.6	17.3	30.7	4.3	35	

	Clinton Keith Road Westbound			California Oaks Road Northbound			Clinton Keith Road Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:30 AM										
07:30 AM	153	198	351	35	113	148	**253**	25	**278**	777
07:45 AM	125	200	325	28	**121**	**149**	222	34	256	730
08:00 AM	120	203	323	**38**	103	141	222	36	258	722
08:15 AM	**173**	**254**	**427**	30	94	124	203	**39**	242	**793**
Total Volume	571	855	1426	131	431	562	900	134	1034	3022
% App. Total	40	60		23.3	76.7		87	13		
PHF	.825	.842	.835	.862	.890	.943	.889	.859	.930	.953

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City of Murrieta
N/S: California Oaks Road
E/W: Clinton Keith Road
Weather: Clear

File Name : 07_MUR_Cal Oaks_Clinton Keith AM
Site Code : 04218933
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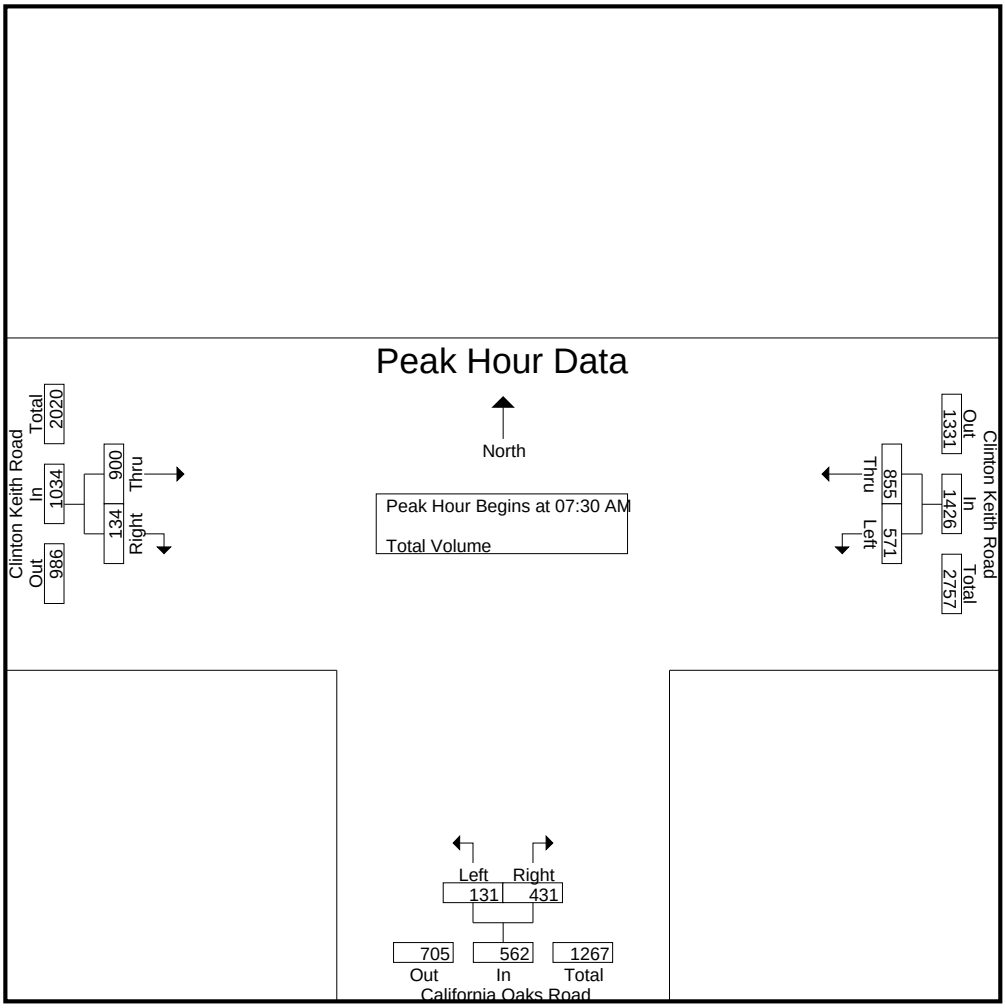

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:45 AM			07:30 AM			07:00 AM		
+0 mins.	125	200	325	35	113	148	**291**	26	**317**
+15 mins.	120	203	323	28	**121**	**149**	224	29	253
+30 mins.	**173**	**254**	**427**	**38**	103	141	253	25	278
+45 mins.	148	224	372	30	94	124	222	**34**	256
Total Volume	566	881	1447	131	431	562	990	114	1104
% App. Total	39.1	60.9		23.3	76.7		89.7	10.3	
PHF	.818	.867	.847	.862	.890	.943	.851	.838	.871

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City of Murrieta
N/S: California Oaks Road
E/W: Clinton Keith Road
Weather: Clear

File Name : 07_MUR_Cal Oaks_Clinton Keith PM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	Clinton Keith Road Westbound			California Oaks Road Northbound			Clinton Keith Road Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
04:00 PM	117	240	357	41	142	183	246	28	274	814
04:15 PM	86	207	293	35	155	190	247	29	276	759
04:30 PM	86	213	299	33	131	164	268	20	288	751
04:45 PM	109	243	352	49	165	214	243	39	282	848
Total	398	903	1301	158	593	751	1004	116	1120	3172
05:00 PM	107	239	346	51	193	244	216	25	241	831
05:15 PM	112	240	352	40	172	212	269	26	295	859
05:30 PM	95	234	329	58	180	238	254	27	281	848
05:45 PM	121	237	358	49	138	187	218	22	240	785
Total	435	950	1385	198	683	881	957	100	1057	3323
Grand Total	833	1853	2686	356	1276	1632	1961	216	2177	6495
Apprch %	31	69		21.8	78.2		90.1	9.9		
Total %	12.8	28.5	41.4	5.5	19.6	25.1	30.2	3.3	33.5	

	Clinton Keith Road Westbound			California Oaks Road Northbound			Clinton Keith Road Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:45 PM										
04:45 PM	109	**243**	**352**	49	165	214	243	**39**	282	848
05:00 PM	107	239	346	51	**193**	**244**	216	25	241	831
05:15 PM	**112**	240	352	40	172	212	**269**	26	**295**	**859**
05:30 PM	95	234	329	**58**	180	238	254	27	281	848
Total Volume	423	956	1379	198	710	908	982	117	1099	3386
% App. Total	30.7	69.3		21.8	78.2		89.4	10.6		
PHF	.944	.984	.979	.853	.920	.930	.913	.750	.931	.985

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City of Murrieta
N/S: California Oaks Road
E/W: Clinton Keith Road
Weather: Clear

File Name : 07_MUR_Cal Oaks_Clinton Keith PM
Site Code : 04218933
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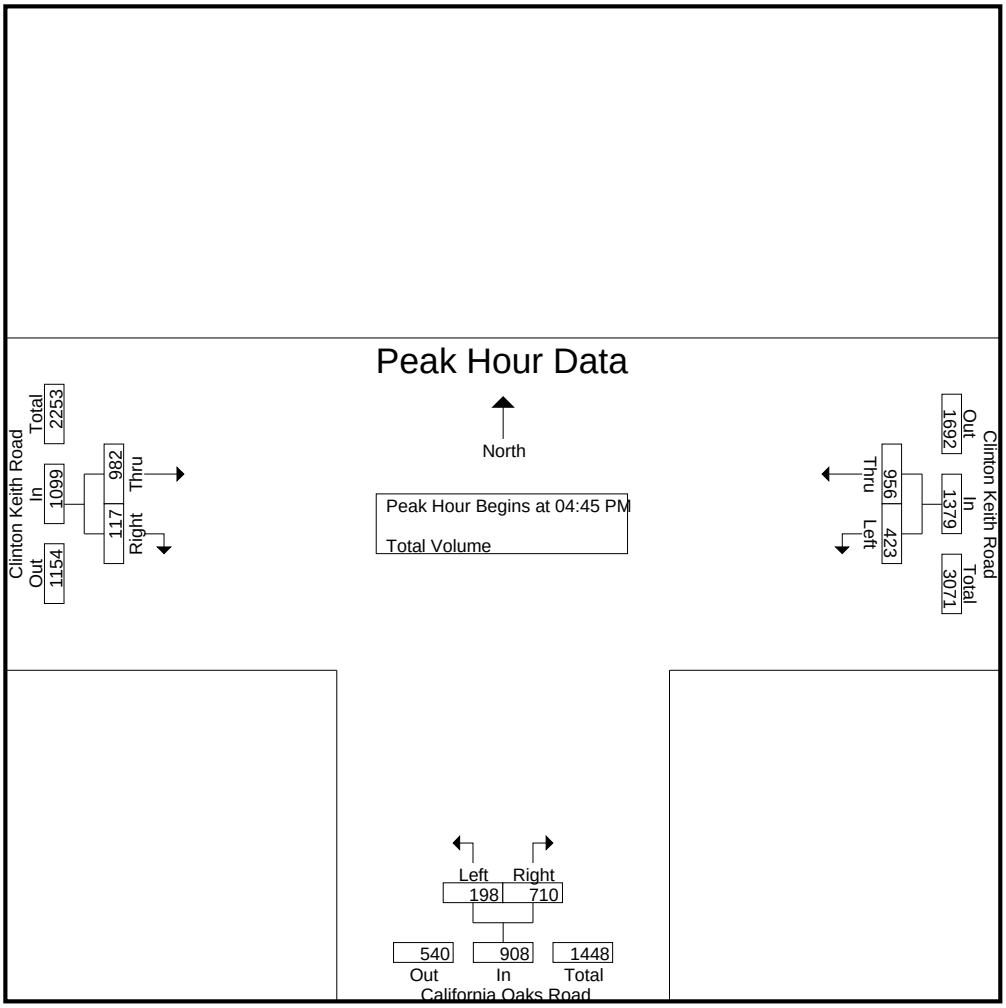

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	05:00 PM			04:45 PM			04:00 PM		
+0 mins.	107	239	346	49	165	214	246	28	274
+15 mins.	112	**240**	352	51	**193**	**244**	247	29	276
+30 mins.	95	234	329	40	172	212	**268**	20	**288**
+45 mins.	**121**	237	**358**	**58**	180	238	243	**39**	282
Total Volume	435	950	1385	198	710	908	1004	116	1120
% App. Total	31.4	68.6		21.8	78.2		89.6	10.4	
PHF	.899	.990	.967	.853	.920	.930	.937	.744	.972

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City of Murrieta
N/S: Jefferson Avenue
E/W: Kalmia Street
Weather: Clear

File Name : 08_MUR_Jefferson_Kalmia AM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	Jefferson Avenue Southbound				Kalmia Street Westbound				Jefferson Avenue Northbound				Kalmia Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	32	33	2	67	17	117	52	186	35	23	8	66	1	84	16	101	420
07:15 AM	58	53	2	113	41	124	53	218	35	22	19	76	0	133	34	167	574
07:30 AM	51	75	4	130	46	97	31	174	14	16	17	47	1	139	60	200	551
07:45 AM	45	73	5	123	42	116	52	210	27	27	15	69	4	137	42	183	585
Total	186	234	13	433	146	454	188	788	111	88	59	258	6	493	152	651	2130
08:00 AM	42	65	17	124	44	130	47	221	38	31	17	86	2	131	41	174	605
08:15 AM	51	59	23	133	52	181	49	282	33	31	23	87	8	195	69	272	774
08:30 AM	60	88	2	150	49	125	44	218	34	34	35	103	11	165	66	242	713
08:45 AM	39	63	4	106	56	135	46	237	34	26	31	91	5	197	81	283	717
Total	192	275	46	513	201	571	186	958	139	122	106	367	26	688	257	971	2809
Grand Total	378	509	59	946	347	1025	374	1746	250	210	165	625	32	1181	409	1622	4939
Apprch %	40	53.8	6.2		19.9	58.7	21.4		40	33.6	26.4		2	72.8	25.2		
Total %	7.7	10.3	1.2	19.2	7	20.8	7.6	35.4	5.1	4.3	3.3	12.7	0.6	23.9	8.3	32.8	

	Jefferson Avenue Southbound				Kalmia Street Westbound				Jefferson Avenue Northbound				Kalmia Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	42	65	17	124	44	130	47	221	**38**	31	17	86	2	131	41	174	605
08:15 AM	51	59	**23**	133	52	**181**	**49**	**282**	33	31	23	87	8	195	69	272	**774**
08:30 AM	**60**	**88**	2	**150**	49	125	44	218	34	**34**	**35**	**103**	**11**	165	66	242	713
08:45 AM	39	63	4	106	**56**	135	46	237	34	26	31	91	5	**197**	**81**	**283**	717
Total Volume	192	275	46	513	201	571	186	958	139	122	106	367	26	688	257	971	2809
% App. Total	37.4	53.6	9		21	59.6	19.4		37.9	33.2	28.9		2.7	70.9	26.5		
PHF	.800	.781	.500	.855	.897	.789	.949	.849	.914	.897	.757	.891	.591	.873	.793	.858	.907

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City of Murrieta
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Weather: Clear

File Name : 08_MUR_Jefferson_Kalmia AM
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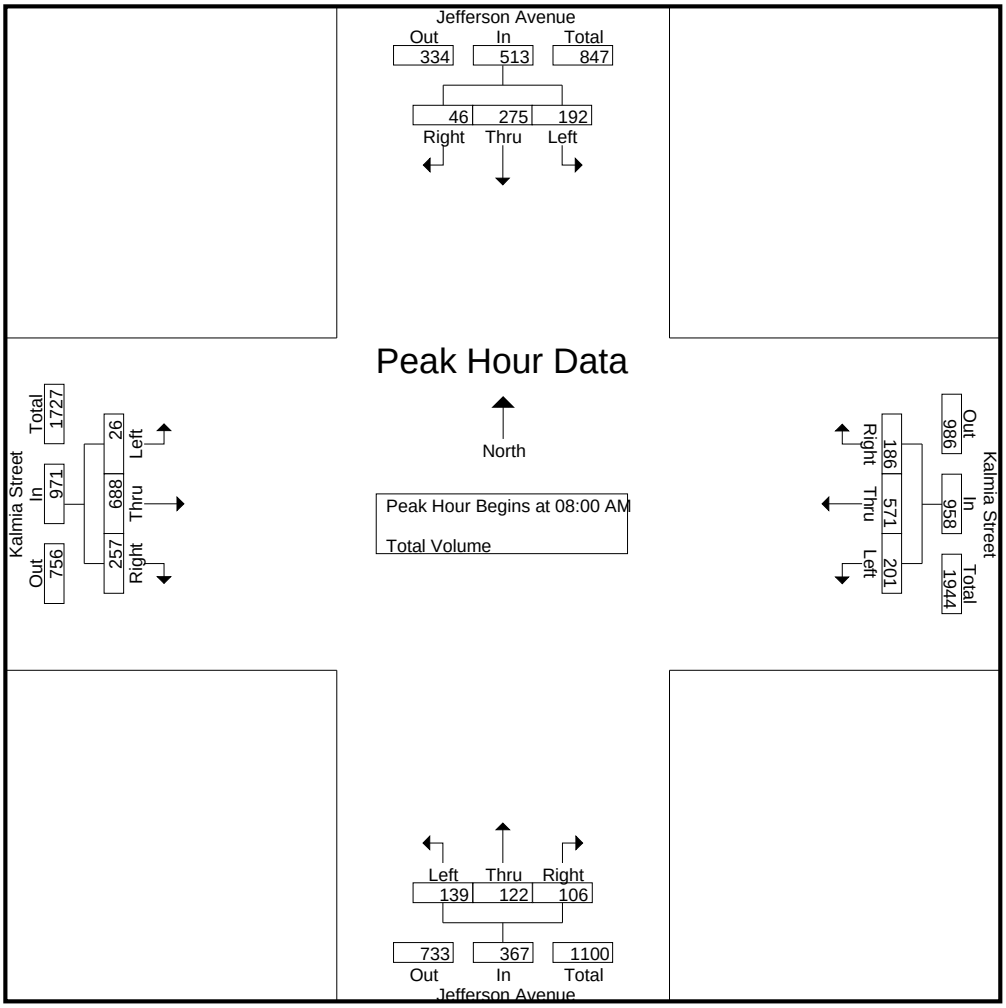

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:45 AM				08:00 AM				08:00 AM				08:00 AM			
+0 mins.	45	73	5	123	44	130	47	221	**38**	31	17	86	2	131	41	174
+15 mins.	42	65	17	124	52	**181**	**49**	**282**	33	31	23	87	8	195	69	272
+30 mins.	51	59	**23**	133	49	125	44	218	34	**34**	**35**	**103**	**11**	165	66	242
+45 mins.	**60**	**88**	2	**150**	**56**	135	46	237	34	26	31	91	5	**197**	**81**	**283**
Total Volume	198	285	47	530	201	571	186	958	139	122	106	367	26	688	257	971
% App. Total	37.4	53.8	8.9		21	59.6	19.4		37.9	33.2	28.9		2.7	70.9	26.5	
PHF	.825	.810	.511	.883	.897	.789	.949	.849	.914	.897	.757	.891	.591	.873	.793	.858

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City of Murrieta
N/S: Jefferson Avenue
E/W: Kalmia Street
Weather: Clear

File Name : 08_MUR_Jefferson_Kalmia PM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	Jefferson Avenue Southbound				Kalmia Street Westbound				Jefferson Avenue Northbound				Kalmia Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	47	44	6	97	47	129	62	238	46	62	82	190	5	140	53	198	723
04:15 PM	55	57	5	117	30	102	44	176	48	92	100	240	0	119	31	150	683
04:30 PM	39	40	3	82	34	107	67	208	42	88	118	248	5	130	32	167	705
04:45 PM	46	41	5	92	36	126	74	236	51	104	87	242	6	126	55	187	757
Total	187	182	19	388	147	464	247	858	187	346	387	920	16	515	171	702	2868
05:00 PM	28	34	9	71	33	112	79	224	65	105	116	286	3	148	36	187	768
05:15 PM	37	38	5	80	30	109	68	207	71	115	129	315	3	130	46	179	781
05:30 PM	38	30	1	69	35	100	57	192	64	116	129	309	2	104	43	149	719
05:45 PM	47	36	3	86	29	103	55	187	66	127	110	303	1	111	46	158	734
Total	150	138	18	306	127	424	259	810	266	463	484	1213	9	493	171	673	3002
Grand Total	337	320	37	694	274	888	506	1668	453	809	871	2133	25	1008	342	1375	5870
Apprch %	48.6	46.1	5.3		16.4	53.2	30.3		21.2	37.9	40.8		1.8	73.3	24.9		
Total %	5.7	5.5	0.6	11.8	4.7	15.1	8.6	28.4	7.7	13.8	14.8	36.3	0.4	17.2	5.8	23.4	

	Jefferson Avenue Southbound				Kalmia Street Westbound				Jefferson Avenue Northbound				Kalmia Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	**46**	**41**	5	**92**	**36**	**126**	74	**236**	51	104	87	242	**6**	126	**55**	**187**	757
05:00 PM	28	34	**9**	71	33	112	**79**	224	65	105	116	286	3	**148**	36	187	768
05:15 PM	37	38	5	80	30	109	68	207	**71**	115	**129**	**315**	3	130	46	179	**781**
05:30 PM	38	30	1	69	35	100	57	192	64	**116**	129	309	2	104	43	149	719
Total Volume	149	143	20	312	134	447	278	859	251	440	461	1152	14	508	180	702	3025
% App. Total	47.8	45.8	6.4		15.6	52	32.4		21.8	38.2	40		2	72.4	25.6		
PHF	.810	.872	.556	.848	.931	.887	.880	.910	.884	.948	.893	.914	.583	.858	.818	.939	.968

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City of Murrieta
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E/W: Kalmia Street
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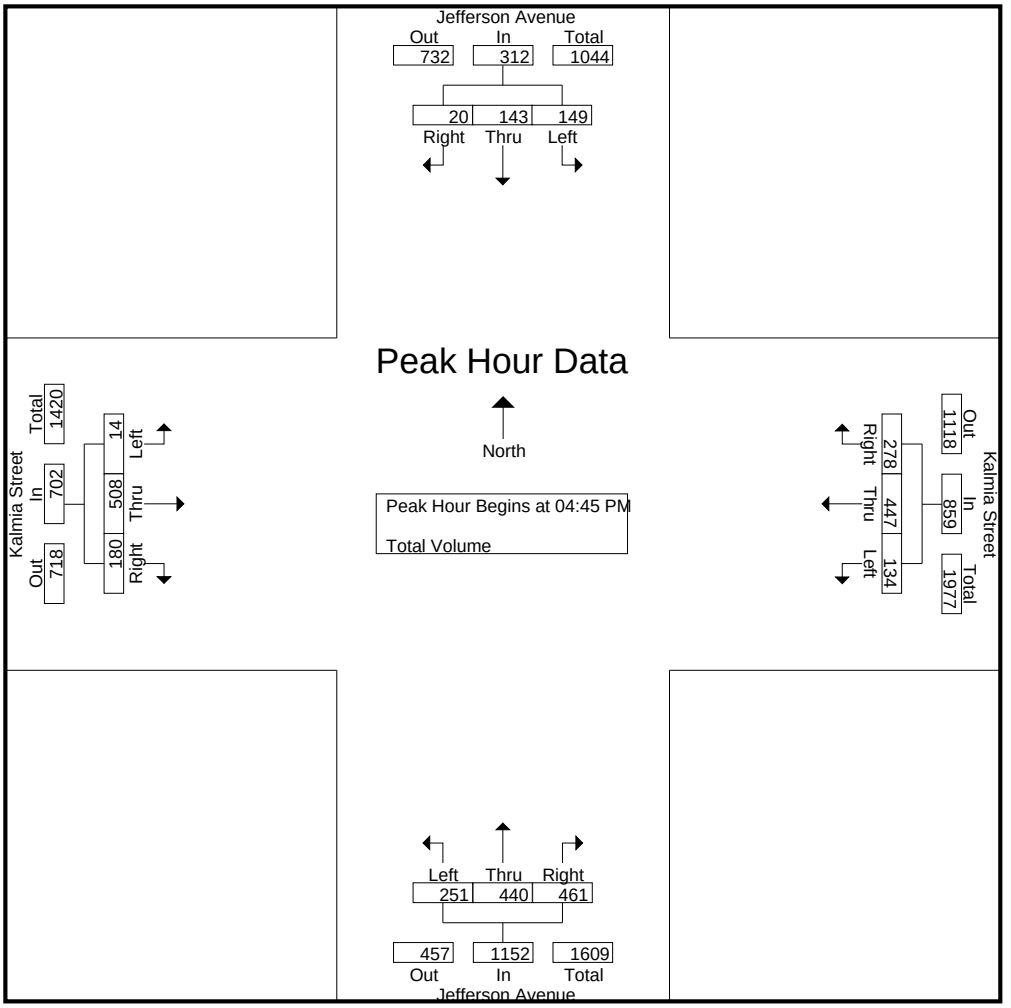

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				04:30 PM				05:00 PM				04:30 PM			
+0 mins.	47	44	**6**	97	34	107	67	208	65	105	116	286	5	130	32	167
+15 mins.	**55**	**57**	5	**117**	**36**	**126**	74	**236**	**71**	115	**129**	**315**	**6**	126	**55**	**187**
+30 mins.	39	40	3	82	33	112	**79**	224	64	116	129	309	3	**148**	36	187
+45 mins.	46	41	5	92	30	109	68	207	66	**127**	110	303	3	130	46	179
Total Volume	187	182	19	388	133	454	288	875	266	463	484	1213	17	534	169	720
% App. Total	48.2	46.9	4.9		15.2	51.9	32.9		21.9	38.2	39.9		2.4	74.2	23.5	
PHF	.850	.798	.792	.829	.924	.901	.911	.927	.937	.911	.938	.963	.708	.902	.768	.963

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City of Murrieta
N/S: Winchester Road (SR-79)
E/W: Murrieta Hot Springs Road
Weather: Clear

File Name : 09_MUR_Winchester_MHS AM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	Winchester Road Southbound				Murrieta Hot Springs Road Westbound				Winchester Road Northbound				Murrieta Hot Springs Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	24	394	143	561	96	122	16	234	21	180	46	247	87	72	24	183	1225
07:15 AM	31	343	131	505	59	155	29	243	32	173	70	275	92	108	22	222	1245
07:30 AM	50	385	128	563	60	108	33	201	32	198	37	267	115	113	23	251	1282
07:45 AM	27	358	135	520	82	129	20	231	30	166	38	234	149	131	25	305	1290
Total	132	1480	537	2149	297	514	98	909	115	717	191	1023	443	424	94	961	5042
08:00 AM	40	362	151	553	49	142	19	210	31	148	31	210	106	138	18	262	1235
08:15 AM	55	402	127	584	77	142	22	241	27	165	27	219	107	115	46	268	1312
08:30 AM	49	410	142	601	83	135	16	234	35	134	24	193	78	125	31	234	1262
08:45 AM	52	409	162	623	84	151	12	247	34	171	22	227	87	101	21	209	1306
Total	196	1583	582	2361	293	570	69	932	127	618	104	849	378	479	116	973	5115
Grand Total	328	3063	1119	4510	590	1084	167	1841	242	1335	295	1872	821	903	210	1934	10157
Apprch %	7.3	67.9	24.8		32	58.9	9.1		12.9	71.3	15.8		42.5	46.7	10.9		
Total %	3.2	30.2	11	44.4	5.8	10.7	1.6	18.1	2.4	13.1	2.9	18.4	8.1	8.9	2.1	19	

	Winchester Road Southbound				Murrieta Hot Springs Road Westbound				Winchester Road Northbound				Murrieta Hot Springs Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	50	385	128	563	60	108	**33**	201	**32**	**198**	37	**267**	115	113	23	251	1282
07:45 AM	27	358	135	520	**82**	129	20	231	30	166	**38**	234	**149**	131	25	**305**	1290
08:00 AM	40	362	**151**	553	49	**142**	19	210	31	148	31	210	106	**138**	18	262	1235
08:15 AM	**55**	**402**	127	**584**	77	142	22	**241**	27	165	27	219	107	115	**46**	268	**1312**
Total Volume	172	1507	541	2220	268	521	94	883	120	677	133	930	477	497	112	1086	5119
% App. Total	7.7	67.9	24.4		30.4	59	10.6		12.9	72.8	14.3		43.9	45.8	10.3		
PHF	.782	.937	.896	.950	.817	.917	.712	.916	.938	.855	.875	.871	.800	.900	.609	.890	.975

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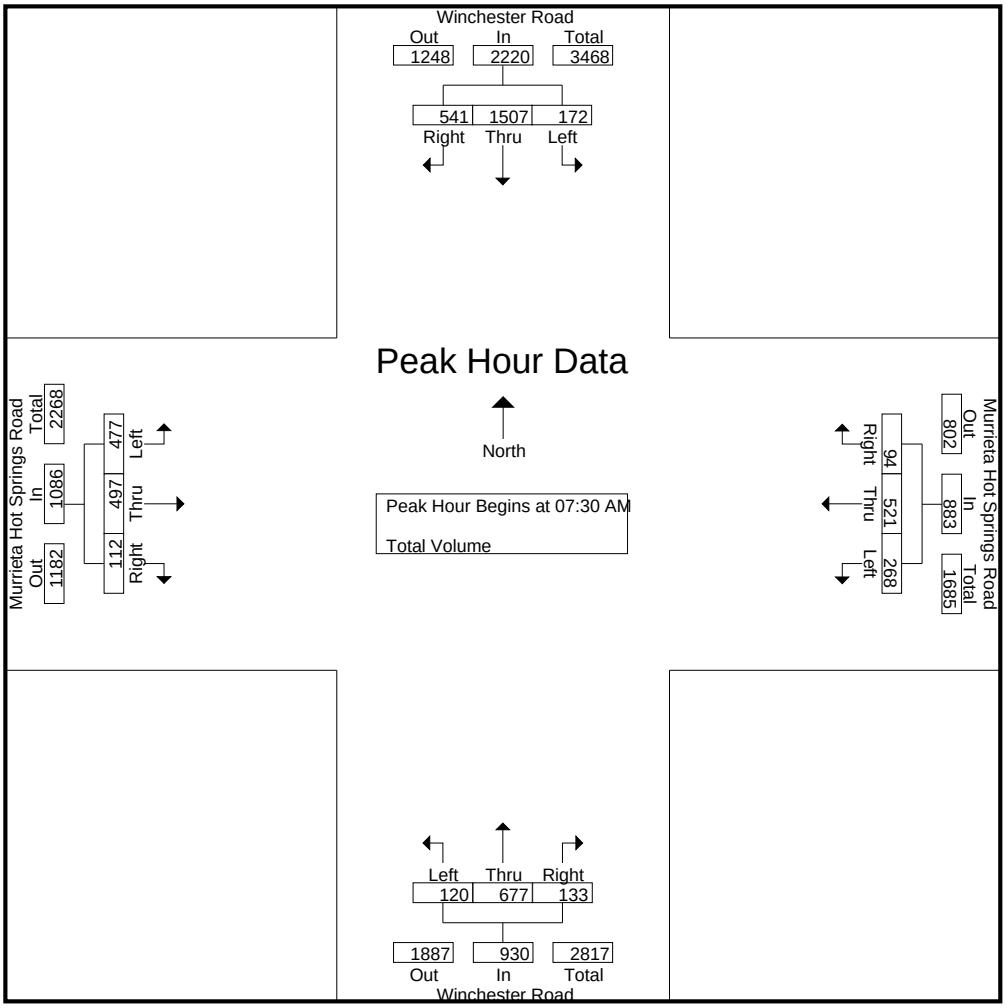
City of Murrieta
N/S: Winchester Road (SR-79)
E/W: Murrieta Hot Springs Road
Weather: Clear

File Name : 09_MUR_Winchester_MHS AM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	08:00 AM				08:00 AM				07:00 AM				07:30 AM			
+0 mins.	40	362	151	553	49	142	19	210	21	180	46	247	115	113	23	251
+15 mins.	**55**	402	127	584	77	142	**22**	241	**32**	173	**70**	**275**	**149**	131	25	**305**
+30 mins.	49	**410**	142	601	83	135	16	234	32	**198**	37	267	106	**138**	18	262
+45 mins.	52	409	**162**	**623**	**84**	**151**	12	**247**	30	166	38	234	107	115	**46**	268
Total Volume	196	1583	582	2361	293	570	69	932	115	717	191	1023	477	497	112	1086
% App. Total	8.3	67	24.7		31.4	61.2	7.4		11.2	70.1	18.7		43.9	45.8	10.3	
PHF	.891	.965	.898	.947	.872	.944	.784	.943	.898	.905	.682	.930	.800	.900	.609	.890

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City of Murrieta
N/S: Winchester Road (SR-79)
E/W: Murrieta Hot Springs Road
Weather: Clear

File Name : 09_MUR_Winchester_MHS PM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	Winchester Road Southbound				Murrieta Hot Springs Road Westbound				Winchester Road Northbound				Murrieta Hot Springs Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	49	226	118	393	82	187	28	297	53	418	49	520	126	163	39	328	1538
04:15 PM	40	293	113	446	60	151	24	235	29	403	42	474	141	163	38	342	1497
04:30 PM	25	275	139	439	96	170	19	285	42	391	40	473	144	160	39	343	1540
04:45 PM	45	262	116	423	73	175	30	278	39	359	53	451	127	209	49	385	1537
Total	159	1056	486	1701	311	683	101	1095	163	1571	184	1918	538	695	165	1398	6112
05:00 PM	62	229	140	431	81	180	20	281	51	417	44	512	133	173	49	355	1579
05:15 PM	60	271	122	453	65	169	31	265	35	300	33	368	126	178	31	335	1421
05:30 PM	46	254	98	398	82	146	29	257	33	330	39	402	131	197	36	364	1421
05:45 PM	58	254	100	412	55	132	25	212	41	412	36	489	144	173	38	355	1468
Total	226	1008	460	1694	283	627	105	1015	160	1459	152	1771	534	721	154	1409	5889
Grand Total	385	2064	946	3395	594	1310	206	2110	323	3030	336	3689	1072	1416	319	2807	12001
Apprch %	11.3	60.8	27.9		28.2	62.1	9.8		8.8	82.1	9.1		38.2	50.4	11.4		
Total %	3.2	17.2	7.9	28.3	4.9	10.9	1.7	17.6	2.7	25.2	2.8	30.7	8.9	11.8	2.7	23.4	

	Winchester Road Southbound				Murrieta Hot Springs Road Westbound				Winchester Road Northbound				Murrieta Hot Springs Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	40	**293**	113	**446**	60	151	24	235	29	403	42	474	141	163	38	342	1497
04:30 PM	25	275	139	439	**96**	170	19	**285**	42	391	40	473	**144**	160	39	343	1540
04:45 PM	45	262	116	423	73	175	**30**	278	39	359	**53**	451	127	**209**	**49**	**385**	1537
05:00 PM	**62**	229	**140**	431	81	**180**	20	281	**51**	**417**	44	**512**	133	173	49	355	**1579**
Total Volume	172	1059	508	1739	310	676	93	1079	161	1570	179	1910	545	705	175	1425	6153
% App. Total	9.9	60.9	29.2		28.7	62.7	8.6		8.4	82.2	9.4		38.2	49.5	12.3		
PHF	.694	.904	.907	.975	.807	.939	.775	.946	.789	.941	.844	.933	.946	.843	.893	.925	.974

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City of Murrieta
N/S: Winchester Road (SR-79)
E/W: Murrieta Hot Springs Road
Weather: Clear

File Name : 09_MUR_Winchester_MHS PM
Site Code : 04218933
Start Date : 12/12/2018
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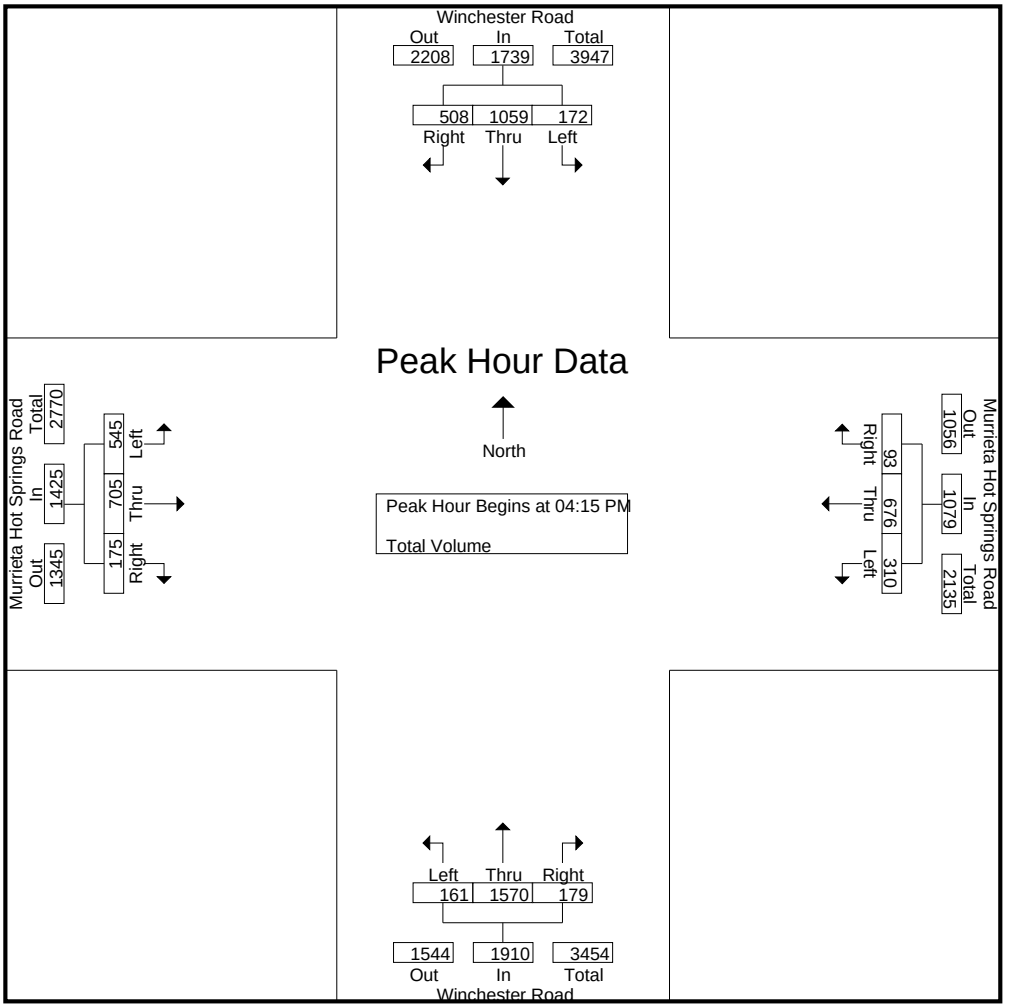

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:00 PM				04:45 PM			
+0 mins.	25	**275**	139	439	**96**	170	19	**285**	**53**	**418**	49	**520**	127	**209**	**49**	**385**
+15 mins.	45	262	116	423	73	175	30	278	29	403	42	474	**133**	173	49	355
+30 mins.	**62**	229	**140**	431	81	**180**	20	281	42	391	40	473	126	178	31	335
+45 mins.	60	271	122	**453**	65	169	**31**	265	39	359	**53**	451	131	197	36	364
Total Volume	192	1037	517	1746	315	694	100	1109	163	1571	184	1918	517	757	165	1439
% App. Total	11	59.4	29.6		28.4	62.6	9		8.5	81.9	9.6		35.9	52.6	11.5	
PHF	.774	.943	.923	.964	.820	.964	.806	.973	.769	.940	.868	.922	.972	.906	.842	.934

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City of Murrieta
N/S: Hancock Avenue
E/W: Los Alamos Road
Weather: Clear

File Name : 10_MUR_Hancock_Los Alamos AM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	Hancock Avenue Southbound				Los Alamos Road Westbound				Hancock Avenue Northbound				Los Alamos Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	84	30	47	161	31	214	26	271	18	16	15	49	13	120	10	143	624
07:15 AM	112	39	75	226	30	302	45	377	44	19	27	90	23	197	20	240	933
07:30 AM	109	55	51	215	66	205	41	312	18	17	15	50	50	205	20	275	852
07:45 AM	120	71	32	223	67	224	64	355	15	36	19	70	31	192	20	243	891
Total	425	195	205	825	194	945	176	1315	95	88	76	259	117	714	70	901	3300
08:00 AM	120	51	30	201	75	208	45	328	9	31	27	67	13	152	14	179	775
08:15 AM	123	46	18	187	59	245	54	358	24	23	32	79	14	141	24	179	803
08:30 AM	125	74	31	230	63	221	57	341	14	40	27	81	17	146	23	186	838
08:45 AM	115	46	31	192	64	234	59	357	15	24	19	58	18	165	16	199	806
Total	483	217	110	810	261	908	215	1384	62	118	105	285	62	604	77	743	3222
Grand Total	908	412	315	1635	455	1853	391	2699	157	206	181	544	179	1318	147	1644	6522
Apprch %	55.5	25.2	19.3		16.9	68.7	14.5		28.9	37.9	33.3		10.9	80.2	8.9		
Total %	13.9	6.3	4.8	25.1	7	28.4	6	41.4	2.4	3.2	2.8	8.3	2.7	20.2	2.3	25.2	

	Hancock Avenue Southbound				Los Alamos Road Westbound				Hancock Avenue Northbound				Los Alamos Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	112	39	**75**	**226**	30	**302**	45	**377**	**44**	19	**27**	**90**	23	197	**20**	240	**933**
07:30 AM	109	55	51	215	66	205	41	312	18	17	15	50	**50**	**205**	20	**275**	852
07:45 AM	**120**	**71**	32	223	67	224	**64**	355	15	**36**	19	70	31	192	20	243	891
08:00 AM	120	51	30	201	**75**	208	45	328	9	31	27	67	13	152	14	179	775
Total Volume	461	216	188	865	238	939	195	1372	86	103	88	277	117	746	74	937	3451
% App. Total	53.3	25	21.7		17.3	68.4	14.2		31	37.2	31.8		12.5	79.6	7.9		
PHF	.960	.761	.627	.957	.793	.777	.762	.910	.489	.715	.815	.769	.585	.910	.925	.852	.925

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City of Murrieta
N/S: Hancock Avenue
E/W: Los Alamos Road
Weather: Clear

File Name : 10_MUR_Hancock_Los Alamos AM
Site Code : 04218933
Start Date : 12/12/2018
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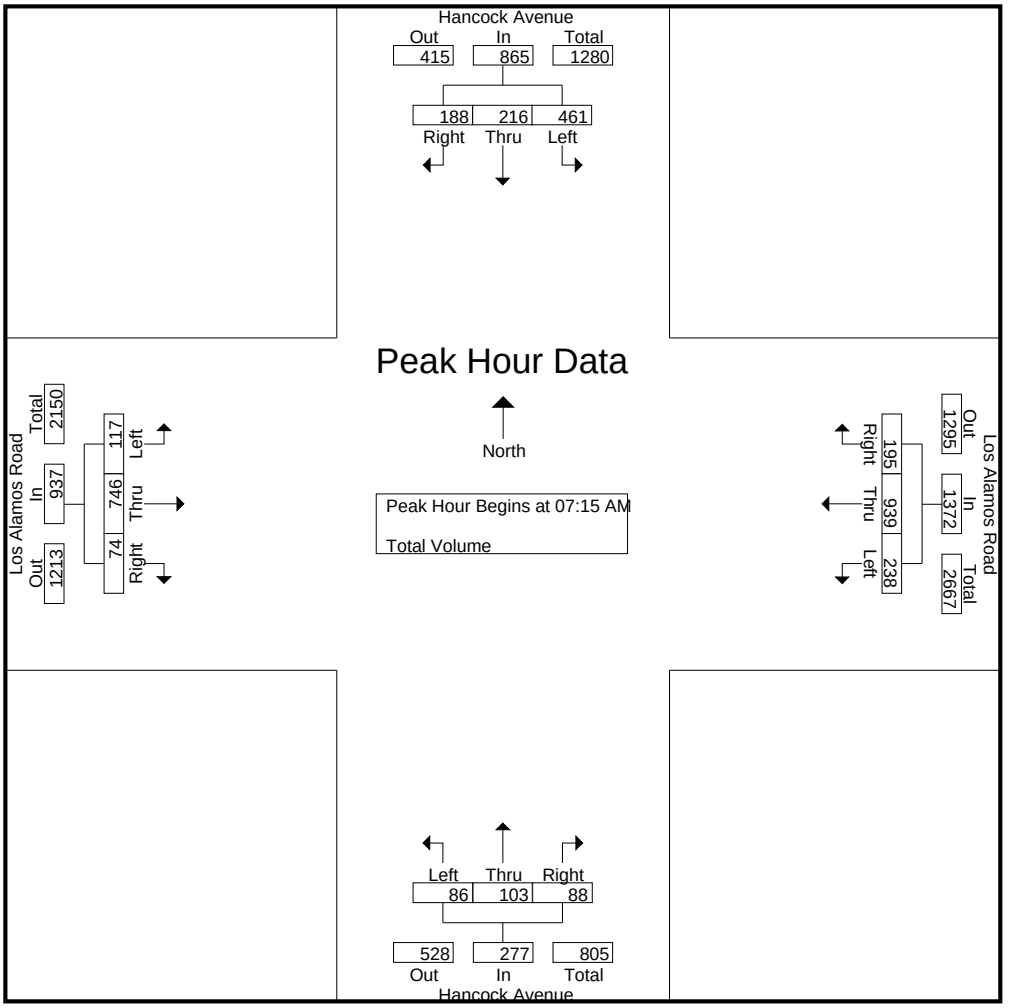

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:15 AM				08:00 AM				07:45 AM				07:15 AM			
+0 mins.	112	39	**75**	**226**	**75**	208	45	328	15	36	19	70	23	197	**20**	240
+15 mins.	109	55	51	215	59	**245**	54	**358**	9	31	27	67	**50**	**205**	20	**275**
+30 mins.	**120**	**71**	32	223	63	221	57	341	**24**	23	**32**	79	31	192	20	243
+45 mins.	120	51	30	201	64	234	**59**	357	14	**40**	27	**81**	13	152	14	179
Total Volume	461	216	188	865	261	908	215	1384	62	130	105	297	117	746	74	937
% App. Total	53.3	25	21.7		18.9	65.6	15.5		20.9	43.8	35.4		12.5	79.6	7.9	
PHF	.960	.761	.627	.957	.870	.927	.911	.966	.646	.813	.820	.917	.585	.910	.925	.852

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City of Murrieta
N/S: Hancock Avenue
E/W: Los Alamos Road
Weather: Clear

File Name : 10_MUR_Hancock_Los Alamos PM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	Hancock Avenue Southbound				Los Alamos Road Westbound				Hancock Avenue Northbound				Los Alamos Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	88	41	20	149	30	159	69	258	35	91	80	206	28	248	18	294	907
04:15 PM	109	35	25	169	42	130	73	245	39	63	63	165	31	269	11	311	890
04:30 PM	116	42	39	197	33	150	54	237	36	72	77	185	33	266	11	310	929
04:45 PM	115	44	29	188	40	160	82	282	42	69	58	169	40	254	22	316	955
Total	428	162	113	703	145	599	278	1022	152	295	278	725	132	1037	62	1231	3681
05:00 PM	123	50	26	199	38	174	68	280	41	97	100	238	34	242	11	287	1004
05:15 PM	138	35	21	194	40	146	69	255	52	98	80	230	24	232	9	265	944
05:30 PM	109	28	25	162	46	127	81	254	40	111	74	225	18	250	14	282	923
05:45 PM	109	28	18	155	35	133	85	253	42	101	48	191	22	305	13	340	939
Total	479	141	90	710	159	580	303	1042	175	407	302	884	98	1029	47	1174	3810
Grand Total	907	303	203	1413	304	1179	581	2064	327	702	580	1609	230	2066	109	2405	7491
Apprch %	64.2	21.4	14.4		14.7	57.1	28.1		20.3	43.6	36		9.6	85.9	4.5		
Total %	12.1	4	2.7	18.9	4.1	15.7	7.8	27.6	4.4	9.4	7.7	21.5	3.1	27.6	1.5	32.1	

	Hancock Avenue Southbound				Los Alamos Road Westbound				Hancock Avenue Northbound				Los Alamos Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	116	42	**39**	197	33	150	54	237	36	72	77	185	33	**266**	11	310	929
04:45 PM	115	44	29	188	**40**	160	**82**	**282**	42	69	58	169	**40**	254	**22**	**316**	955
05:00 PM	123	**50**	26	**199**	38	**174**	68	280	41	97	**100**	**238**	34	242	11	287	**1004**
05:15 PM	**138**	35	21	194	40	146	69	255	**52**	**98**	80	230	24	232	9	265	944
Total Volume	492	171	115	778	151	630	273	1054	171	336	315	822	131	994	53	1178	3832
% App. Total	63.2	22	14.8		14.3	59.8	25.9		20.8	40.9	38.3		11.1	84.4	4.5		
PHF	.891	.855	.737	.977	.944	.905	.832	.934	.822	.857	.788	.863	.819	.934	.602	.932	.954

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City of Murrieta
N/S: Hancock Avenue
E/W: Los Alamos Road
Weather: Clear

File Name : 10_MUR_Hancock_Los Alamos PM
Site Code : 04218933
Start Date : 12/12/2018
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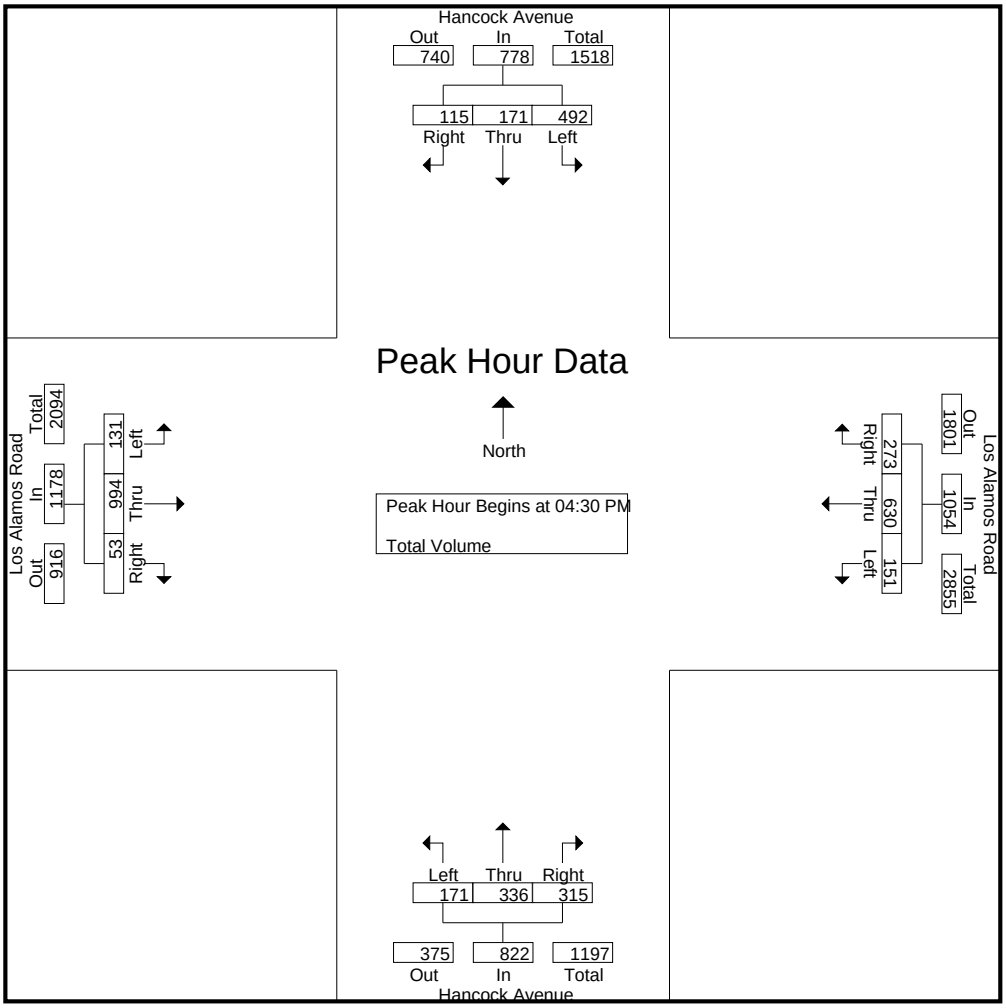

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:45 PM				05:00 PM				04:00 PM			
+0 mins.	116	42	**39**	197	40	160	**82**	**282**	41	97	**100**	**238**	28	248	18	294
+15 mins.	115	44	29	188	38	**174**	68	280	**52**	98	80	230	31	**269**	11	311
+30 mins.	123	**50**	26	**199**	40	146	69	255	40	**111**	74	225	33	266	11	310
+45 mins.	**138**	35	21	194	**46**	127	81	254	42	101	48	191	**40**	254	**22**	**316**
Total Volume	492	171	115	778	164	607	300	1071	175	407	302	884	132	1037	62	1231
% App. Total	63.2	22	14.8		15.3	56.7	28		19.8	46	34.2		10.7	84.2	5	
PHF	.891	.855	.737	.977	.891	.872	.915	.949	.841	.917	.755	.929	.825	.964	.705	.974

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City of Murrieta
N/S: I-215 Southbound Ramps
E/W: Los Alamos Road
Weather: Clear

File Name : 11_MUR_215S_Los Alamos AM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	I-215 Southbound Off Ramp Southbound				Los Alamos Road Westbound				I-215 Southbound On Ramp Northbound				Los Alamos Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	19	0	142	161	53	158	0	211	0	0	0	0	0	166	65	231	603
07:15 AM	32	1	215	248	46	220	0	266	0	0	0	0	0	238	88	326	840
07:30 AM	31	0	191	222	62	207	0	269	0	0	0	0	0	251	118	369	860
07:45 AM	28	1	193	222	54	248	0	302	0	0	0	0	0	232	97	329	853
Total	110	2	741	853	215	833	0	1048	0	0	0	0	0	887	368	1255	3156
08:00 AM	39	2	172	213	54	219	0	273	0	0	0	0	0	234	71	305	791
08:15 AM	48	0	177	225	53	243	0	296	0	0	0	0	0	250	73	323	844
08:30 AM	40	1	170	211	47	230	0	277	0	0	0	0	0	235	85	320	808
08:45 AM	48	1	164	213	38	208	0	246	0	0	0	0	0	190	88	278	737
Total	175	4	683	862	192	900	0	1092	0	0	0	0	0	909	317	1226	3180
Grand Total	285	6	1424	1715	407	1733	0	2140	0	0	0	0	0	1796	685	2481	6336
Apprch %	16.6	0.3	83		19	81	0		0	0	0		0	72.4	27.6		
Total %	4.5	0.1	22.5	27.1	6.4	27.4	0	33.8	0	0	0	0	0	28.3	10.8	39.2	

	I-215 Southbound Off Ramp Southbound				Los Alamos Road Westbound				I-215 Southbound On Ramp Northbound				Los Alamos Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	31	0	191	222	**62**	207	0	269	0	0	0	0	0	**251**	**118**	**369**	**860**
07:45 AM	28	1	**193**	222	54	**248**	0	**302**	0	0	0	0	0	232	97	329	853
08:00 AM	39	**2**	172	213	54	219	0	273	0	0	0	0	0	234	71	305	791
08:15 AM	**48**	0	177	**225**	53	243	0	296	0	0	0	0	0	250	73	323	844
Total Volume	146	3	733	882	223	917	0	1140	0	0	0	0	0	967	359	1326	3348
% App. Total	16.6	0.3	83.1		19.6	80.4	0		0	0	0		0	72.9	27.1		
PHF	.760	.375	.949	.980	.899	.924	.000	.944	.000	.000	.000	.000	.000	.963	.761	.898	.973

Counts Unlimited
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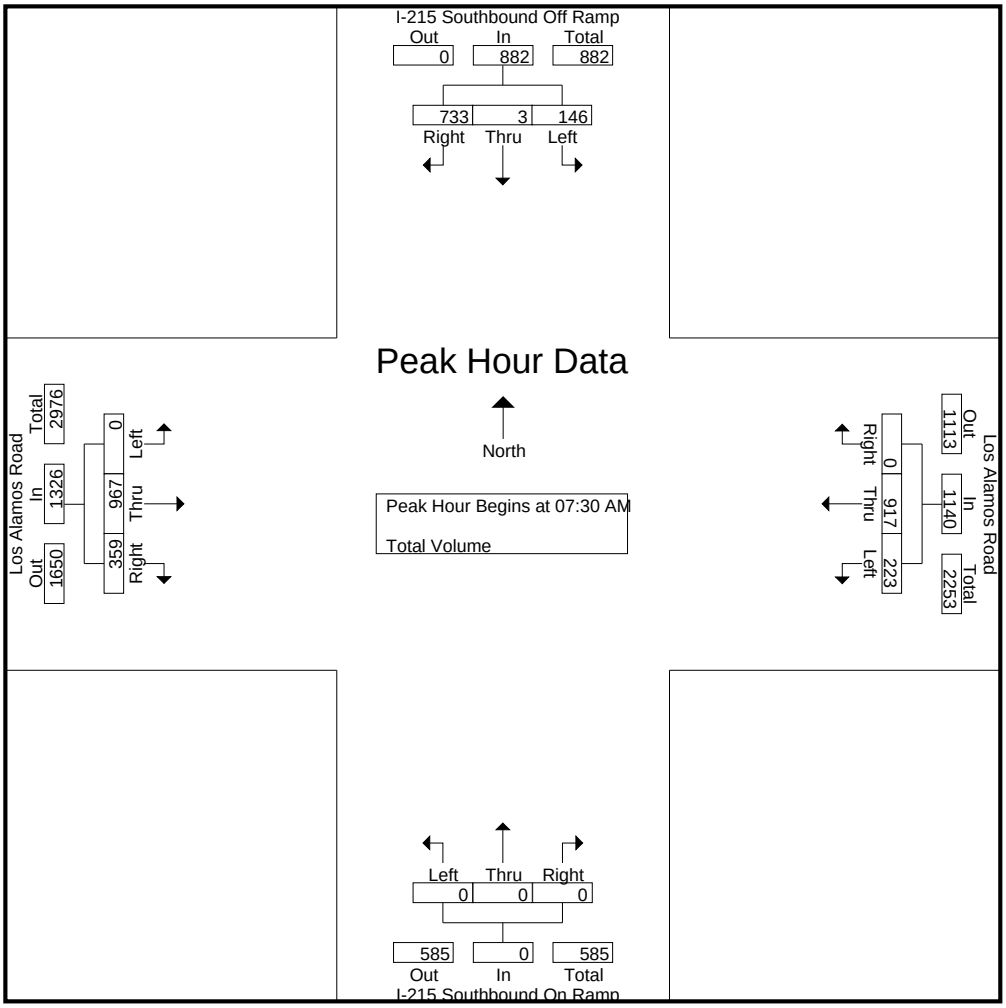
City of Murrieta
N/S: I-215 Southbound Ramps
E/W: Los Alamos Road
Weather: Clear

File Name : 11_MUR_215S_Los Alamos AM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:15 AM				07:45 AM				07:00 AM				07:15 AM			
+0 mins.	32	1	**215**	**248**	**54**	**248**	0	**302**	0	0	0	0	0	238	88	326
+15 mins.	31	0	191	222	54	219	0	273	0	0	0	0	0	**251**	**118**	**369**
+30 mins.	28	1	193	222	53	243	0	296	0	0	0	0	0	232	97	329
+45 mins.	**39**	**2**	172	213	47	230	0	277	0	0	0	0	0	234	71	305
Total Volume	130	4	771	905	208	940	0	1148	0	0	0	0	0	955	374	1329
% App. Total	14.4	0.4	85.2		18.1	81.9	0		0	0	0		0	71.9	28.1	
PHF	.833	.500	.897	.912	.963	.948	.000	.950	.000	.000	.000	.000	.000	.951	.792	.900

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City of Murrieta
N/S: I-215 Southbound Ramps
E/W: Los Alamos Road
Weather: Clear

File Name : 11_MUR_215S_Los Alamos PM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	I-215 Southbound Off Ramp Southbound				Los Alamos Road Westbound				I-215 Southbound On Ramp Northbound				Los Alamos Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	26	0	110	136	37	196	0	233	0	0	0	0	0	344	61	405	774
04:15 PM	41	1	121	163	46	197	0	243	0	0	0	0	0	375	70	445	851
04:30 PM	32	0	96	128	37	131	0	168	0	0	0	0	0	297	67	364	660
04:45 PM	40	0	102	142	26	205	0	231	0	0	0	0	0	359	67	426	799
Total	139	1	429	569	146	729	0	875	0	0	0	0	0	1375	265	1640	3084
05:00 PM	35	3	116	154	56	202	0	258	0	0	0	0	0	378	67	445	857
05:15 PM	48	2	119	169	38	208	0	246	0	0	0	0	0	424	78	502	917
05:30 PM	56	1	111	168	32	178	0	210	0	0	0	0	0	416	71	487	865
05:45 PM	60	1	109	170	27	205	0	232	0	0	0	0	0	399	65	464	866
Total	199	7	455	661	153	793	0	946	0	0	0	0	0	1617	281	1898	3505
Grand Total	338	8	884	1230	299	1522	0	1821	0	0	0	0	0	2992	546	3538	6589
Apprch %	27.5	0.7	71.9		16.4	83.6	0		0	0	0		0	84.6	15.4		
Total %	5.1	0.1	13.4	18.7	4.5	23.1	0	27.6	0	0	0	0	0	45.4	8.3	53.7	

	I-215 Southbound Off Ramp Southbound				Los Alamos Road Westbound				I-215 Southbound On Ramp Northbound				Los Alamos Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	35	**3**	116	154	**56**	202	0	**258**	0	0	0	0	0	378	67	445	857
05:15 PM	48	2	**119**	169	38	**208**	0	246	0	0	0	0	0	**424**	**78**	**502**	**917**
05:30 PM	56	1	111	168	32	178	0	210	0	0	0	0	0	416	71	487	865
05:45 PM	**60**	1	109	**170**	27	205	0	232	0	0	0	0	0	399	65	464	866
Total Volume	199	7	455	661	153	793	0	946	0	0	0	0	0	1617	281	1898	3505
% App. Total	30.1	1.1	68.8		16.2	83.8	0		0	0	0		0	85.2	14.8		
PHF	.829	.583	.956	.972	.683	.953	.000	.917	.000	.000	.000	.000	.000	.953	.901	.945	.956

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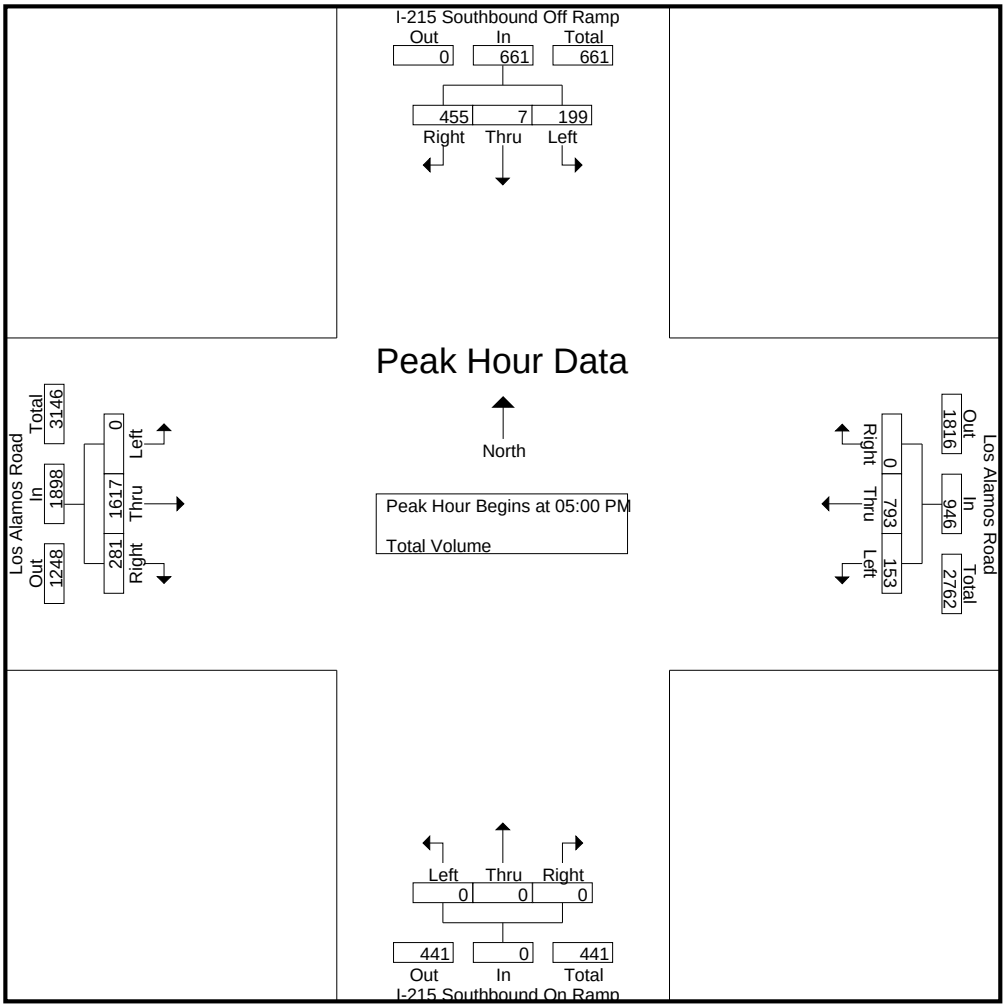
City of Murrieta
N/S: I-215 Southbound Ramps
E/W: Los Alamos Road
Weather: Clear

File Name : 11_MUR_215S_Los Alamos PM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	05:00 PM				05:00 PM				04:00 PM				05:00 PM			
+0 mins.	35	**3**	116	154	**56**	202	0	**258**	0	0	0	0	0	378	67	445
+15 mins.	48	2	**119**	169	38	**208**	0	246	0	0	0	0	0	**424**	**78**	**502**
+30 mins.	56	1	111	168	32	178	0	210	0	0	0	0	0	416	71	487
+45 mins.	**60**	1	109	**170**	27	205	0	232	0	0	0	0	0	399	65	464
Total Volume	199	7	455	661	153	793	0	946	0	0	0	0	0	1617	281	1898
% App. Total	30.1	1.1	68.8		16.2	83.8	0		0	0	0		0	85.2	14.8	
PHF	.829	.583	.956	.972	.683	.953	.000	.917	.000	.000	.000	.000	.000	.953	.901	.945

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City of Murrieta
N/S: Whitewood Road
E/W: Murrieta Hot Springs Road
Weather: Clear

File Name : 12_MUR_Whitewood_MHS AM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	Whitewood Road Southbound				Murrieta Hot Springs Road Westbound				Whitewood Road Northbound				Murrieta Hot Springs Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	75	6	31	112	3	425	77	505	19	9	10	38	10	181	3	194	849
07:15 AM	94	7	24	125	5	456	46	507	6	4	10	20	14	262	4	280	932
07:30 AM	111	10	30	151	4	341	27	372	12	7	12	31	6	320	3	329	883
07:45 AM	91	7	33	131	7	430	65	502	10	4	11	25	6	373	3	382	1040
Total	371	30	118	519	19	1652	215	1886	47	24	43	114	36	1136	13	1185	3704
08:00 AM	91	3	36	130	3	369	52	424	9	8	8	25	5	296	3	304	883
08:15 AM	95	11	29	135	6	402	61	469	11	18	13	42	8	310	0	318	964
08:30 AM	144	27	43	214	7	383	69	459	5	32	13	50	9	269	4	282	1005
08:45 AM	108	20	24	152	5	451	78	534	6	6	12	24	17	295	2	314	1024
Total	438	61	132	631	21	1605	260	1886	31	64	46	141	39	1170	9	1218	3876
Grand Total	809	91	250	1150	40	3257	475	3772	78	88	89	255	75	2306	22	2403	7580
Apprch %	70.3	7.9	21.7		1.1	86.3	12.6		30.6	34.5	34.9		3.1	96	0.9		
Total %	10.7	1.2	3.3	15.2	0.5	43	6.3	49.8	1	1.2	1.2	3.4	1	30.4	0.3	31.7	

	Whitewood Road Southbound				Murrieta Hot Springs Road Westbound				Whitewood Road Northbound				Murrieta Hot Springs Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	91	7	33	131	**7**	**430**	65	**502**	10	4	11	25	6	**373**	3	**382**	**1040**
08:00 AM	91	3	36	130	3	369	52	424	9	8	8	25	5	296	3	304	883
08:15 AM	95	11	29	135	6	402	61	469	**11**	18	**13**	42	8	310	0	318	964
08:30 AM	**144**	**27**	**43**	**214**	7	383	**69**	459	5	**32**	13	**50**	**9**	269	**4**	282	1005
Total Volume	421	48	141	610	23	1584	247	1854	35	62	45	142	28	1248	10	1286	3892
% App. Total	69	7.9	23.1		1.2	85.4	13.3		24.6	43.7	31.7		2.2	97	0.8		
PHF	.731	.444	.820	.713	.821	.921	.895	.923	.795	.484	.865	.710	.778	.836	.625	.842	.936

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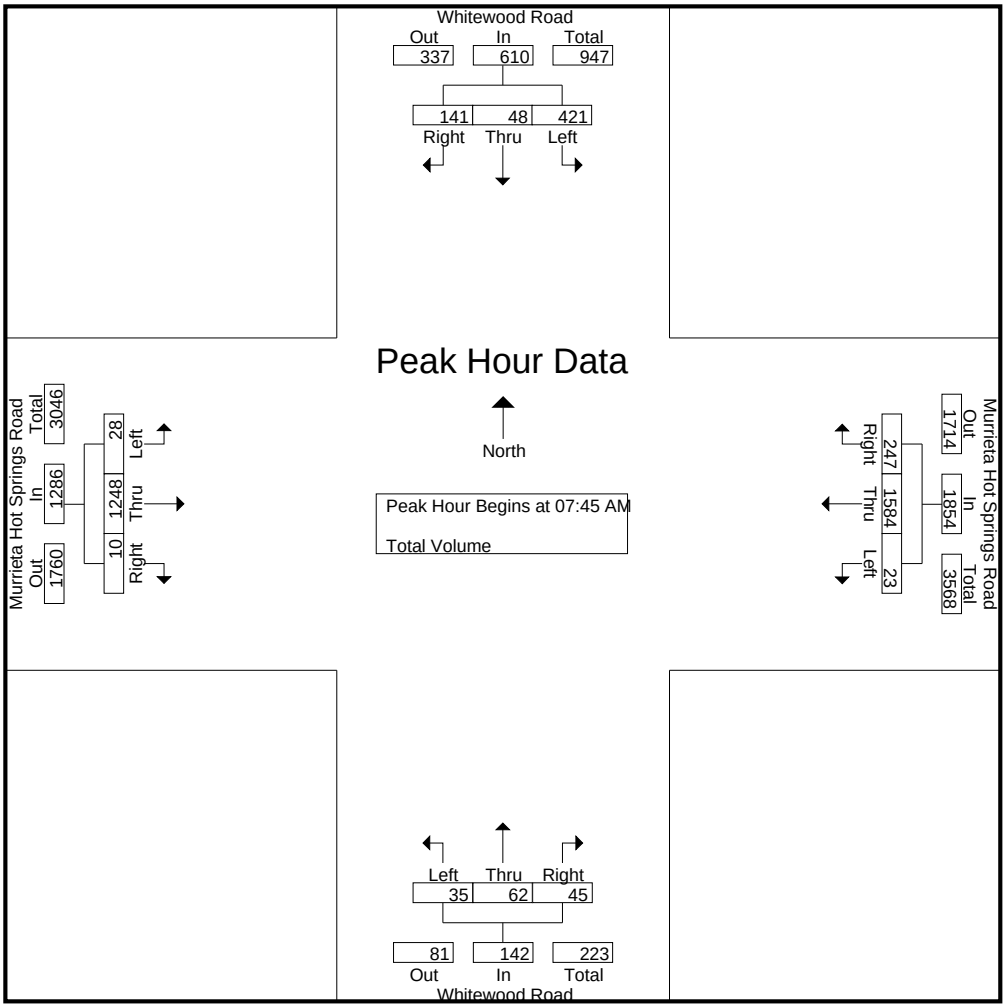
City of Murrieta
N/S: Whitewood Road
E/W: Murrieta Hot Springs Road
Weather: Clear

File Name : 12_MUR_Whitewood_MHS AM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	08:00 AM				07:00 AM				07:45 AM				07:30 AM			
+0 mins.	91	3	36	130	3	425	**77**	505	10	4	11	25	6	320	**3**	329
+15 mins.	95	11	29	135	5	**456**	46	**507**	9	8	8	25	6	**373**	3	**382**
+30 mins.	**144**	**27**	**43**	**214**	4	341	27	372	**11**	18	**13**	42	5	296	3	304
+45 mins.	108	20	24	152	**7**	430	65	502	5	**32**	13	**50**	**8**	310	0	318
Total Volume	438	61	132	631	19	1652	215	1886	35	62	45	142	25	1299	9	1333
% App. Total	69.4	9.7	20.9		1	87.6	11.4		24.6	43.7	31.7		1.9	97.4	0.7	
PHF	.760	.565	.767	.737	.679	.906	.698	.930	.795	.484	.865	.710	.781	.871	.750	.872

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City of Murrieta
N/S: Whitewood Road
E/W: Murrieta Hot Springs Road
Weather: Clear

File Name : 12_MUR_Whitewood_MHS PM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	Whitewood Road Southbound				Murrieta Hot Springs Road Westbound				Whitewood Road Northbound				Murrieta Hot Springs Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	89	5	24	118	11	392	82	485	6	7	10	23	56	437	11	504	1130
04:15 PM	119	7	27	153	5	421	106	532	4	5	9	18	33	399	11	443	1146
04:30 PM	102	6	28	136	11	401	100	512	8	5	9	22	38	448	5	491	1161
04:45 PM	110	6	25	141	10	423	114	547	6	2	11	19	36	421	9	466	1173
Total	420	24	104	548	37	1637	402	2076	24	19	39	82	163	1705	36	1904	4610
05:00 PM	96	6	29	131	12	457	103	572	4	7	10	21	55	408	14	477	1201
05:15 PM	75	8	16	99	12	410	107	529	10	5	9	24	40	434	11	485	1137
05:30 PM	82	6	23	111	7	405	112	524	7	5	4	16	41	420	8	469	1120
05:45 PM	92	11	33	136	5	348	97	450	4	6	6	16	48	463	11	522	1124
Total	345	31	101	477	36	1620	419	2075	25	23	29	77	184	1725	44	1953	4582
Grand Total	765	55	205	1025	73	3257	821	4151	49	42	68	159	347	3430	80	3857	9192
Apprch %	74.6	5.4	20		1.8	78.5	19.8		30.8	26.4	42.8		9	88.9	2.1		
Total %	8.3	0.6	2.2	11.2	0.8	35.4	8.9	45.2	0.5	0.5	0.7	1.7	3.8	37.3	0.9	42	

	Whitewood Road Southbound				Murrieta Hot Springs Road Westbound				Whitewood Road Northbound				Murrieta Hot Springs Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	**119**	**7**	27	**153**	5	421	106	532	4	5	9	18	33	399	11	443	1146
04:30 PM	102	6	28	136	11	401	100	512	**8**	5	9	**22**	38	**448**	5	**491**	1161
04:45 PM	110	6	25	141	10	423	**114**	547	6	2	**11**	19	36	421	9	466	1173
05:00 PM	96	6	**29**	131	**12**	**457**	103	**572**	4	**7**	10	21	**55**	408	**14**	477	**1201**
Total Volume	427	25	109	561	38	1702	423	2163	22	19	39	80	162	1676	39	1877	4681
% App. Total	76.1	4.5	19.4		1.8	78.7	19.6		27.5	23.8	48.8		8.6	89.3	2.1		
PHF	.897	.893	.940	.917	.792	.931	.928	.945	.688	.679	.886	.909	.736	.935	.696	.956	.974

Counts Unlimited
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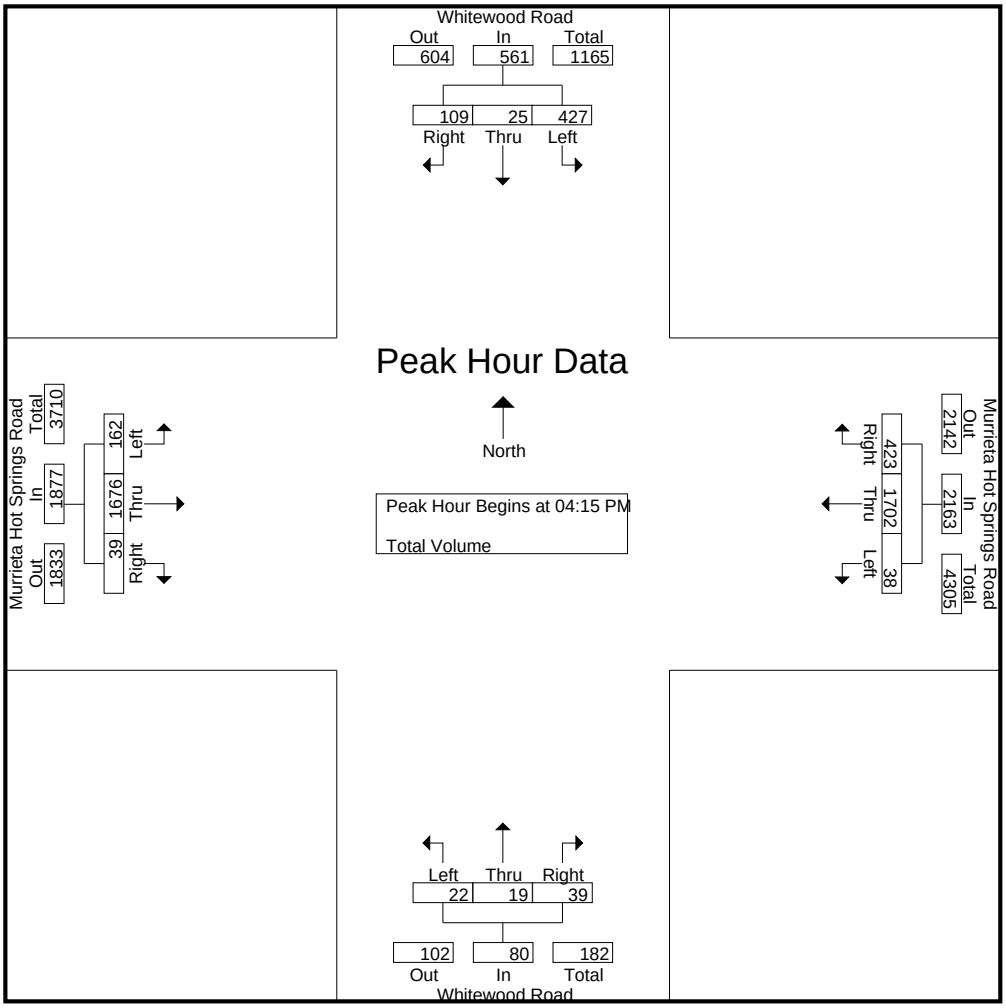
City of Murrieta
N/S: Whitewood Road
E/W: Murrieta Hot Springs Road
Weather: Clear

File Name : 12_MUR_Whitewood_MHS PM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:15 PM				04:45 PM				04:30 PM				05:00 PM			
+0 mins.	**119**	**7**	27	**153**	10	423	**114**	547	8	5	9	22	**55**	408	**14**	477
+15 mins.	102	6	28	136	**12**	**457**	103	**572**	6	2	**11**	19	40	434	11	485
+30 mins.	110	6	25	141	12	410	107	529	4	**7**	10	21	41	420	8	469
+45 mins.	96	6	**29**	131	7	405	112	524	**10**	5	9	**24**	48	**463**	11	**522**
Total Volume	427	25	109	561	41	1695	436	2172	28	19	39	86	184	1725	44	1953
% App. Total	76.1	4.5	19.4		1.9	78	20.1		32.6	22.1	45.3		9.4	88.3	2.3	
PHF	.897	.893	.940	.917	.854	.927	.956	.949	.700	.679	.886	.896	.836	.931	.786	.935

Counts Unlimited
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City of Murrieta
N/S: Nutmeg Street
E/W: Clinton Keith Road
Weather: Clear

File Name : 13_MUR_Nutmeg_Clinton Keith AM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	Nutmeg Street Southbound				Clinton Keith Road Westbound				Nutmeg Street Northbound				Clinton Keith Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	37	27	5	69	81	118	13	212	15	4	112	131	2	167	12	181	593
07:15 AM	28	26	5	59	69	171	19	259	10	16	109	135	3	148	20	171	624
07:30 AM	29	20	8	57	64	156	16	236	17	11	92	120	5	139	11	155	568
07:45 AM	18	16	4	38	77	140	25	242	20	10	81	111	4	163	26	193	584
Total	112	89	22	223	291	585	73	949	62	41	394	497	14	617	69	700	2369
08:00 AM	42	16	9	67	82	133	23	238	31	14	74	119	10	134	42	186	610
08:15 AM	29	9	7	45	86	188	28	302	37	7	78	122	9	145	17	171	640
08:30 AM	39	10	10	59	61	153	32	246	9	12	80	101	7	111	13	131	537
08:45 AM	30	15	11	56	54	135	14	203	11	12	54	77	11	132	13	156	492
Total	140	50	37	227	283	609	97	989	88	45	286	419	37	522	85	644	2279
Grand Total	252	139	59	450	574	1194	170	1938	150	86	680	916	51	1139	154	1344	4648
Apprch %	56	30.9	13.1		29.6	61.6	8.8		16.4	9.4	74.2		3.8	84.7	11.5		
Total %	5.4	3	1.3	9.7	12.3	25.7	3.7	41.7	3.2	1.9	14.6	19.7	1.1	24.5	3.3	28.9	

	Nutmeg Street Southbound				Clinton Keith Road Westbound				Nutmeg Street Northbound				Clinton Keith Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	29	**20**	8	57	64	156	16	236	17	11	**92**	120	5	139	11	155	568
07:45 AM	18	16	4	38	77	140	25	242	20	10	81	111	4	**163**	26	**193**	584
08:00 AM	**42**	16	**9**	**67**	82	133	23	238	31	**14**	74	119	**10**	134	**42**	186	610
08:15 AM	29	9	7	45	**86**	**188**	**28**	**302**	**37**	7	78	**122**	9	145	17	171	**640**
Total Volume	118	61	28	207	309	617	92	1018	105	42	325	472	28	581	96	705	2402
% App. Total	57	29.5	13.5		30.4	60.6	9		22.2	8.9	68.9		4	82.4	13.6		
PHF	.702	.763	.778	.772	.898	.820	.821	.843	.709	.750	.883	.967	.700	.891	.571	.913	.938

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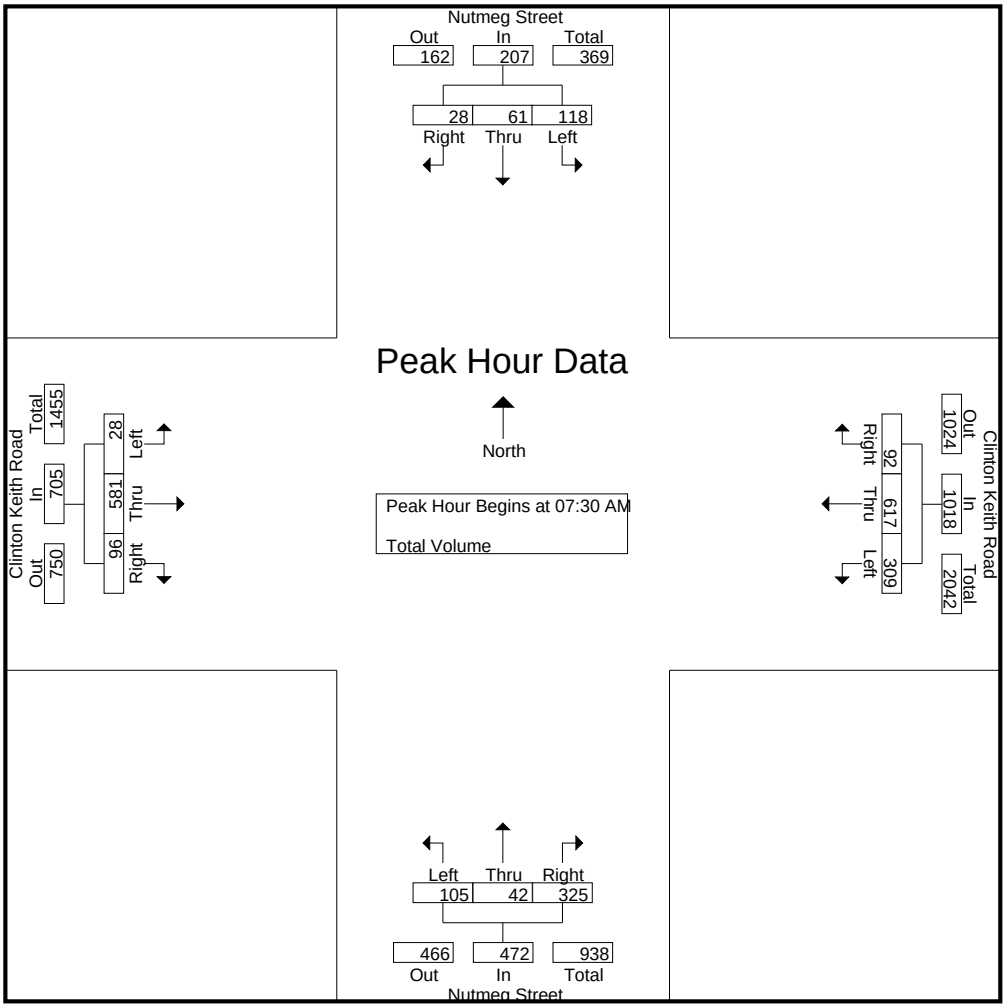
City of Murrieta
N/S: Nutmeg Street
E/W: Clinton Keith Road
Weather: Clear

File Name : 13_MUR_Nutmeg_Clinton Keith AM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	08:00 AM				07:45 AM				07:00 AM				07:15 AM			
+0 mins.	**42**	**16**	9	**67**	77	140	25	242	15	4	**112**	131	3	148	20	171
+15 mins.	29	9	7	45	82	133	23	238	10	**16**	109	**135**	5	139	11	155
+30 mins.	39	10	10	59	**86**	**188**	28	**302**	17	11	92	120	4	**163**	26	**193**
+45 mins.	30	15	**11**	56	61	153	**32**	246	**20**	10	81	111	**10**	134	**42**	186
Total Volume	140	50	37	227	306	614	108	1028	62	41	394	497	22	584	99	705
% App. Total	61.7	22	16.3		29.8	59.7	10.5		12.5	8.2	79.3		3.1	82.8	14	
PHF	.833	.781	.841	.847	.890	.816	.844	.851	.775	.641	.879	.920	.550	.896	.589	.913

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City of Murrieta
N/S: Nutmeg Street
E/W: Clinton Keith Road
Weather: Clear

File Name : 13_MUR_Nutmeg_Clinton Keith PM
Site Code : 04218933
Start Date : 12/12/2018
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Groups Printed- Total Volume

	Nutmeg Street Southbound				Clinton Keith Road Westbound				Nutmeg Street Northbound				Clinton Keith Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	29	11	4	44	72	160	41	273	17	8	68	93	10	185	12	207	617
04:15 PM	22	6	7	35	76	145	24	245	14	14	70	98	11	178	21	210	588
04:30 PM	23	10	9	42	86	146	18	250	15	10	72	97	11	197	14	222	611
04:45 PM	28	12	10	50	88	161	32	281	14	12	56	82	18	207	21	246	659
Total	102	39	30	171	322	612	115	1049	60	44	266	370	50	767	68	885	2475
05:00 PM	21	10	6	37	74	172	33	279	18	10	75	103	10	179	15	204	623
05:15 PM	24	14	3	41	89	171	22	282	18	15	60	93	12	199	18	229	645
05:30 PM	27	9	3	39	87	183	28	298	16	6	50	72	12	193	22	227	636
05:45 PM	18	9	8	35	73	181	34	288	15	12	53	80	15	186	23	224	627
Total	90	42	20	152	323	707	117	1147	67	43	238	348	49	757	78	884	2531
Grand Total	192	81	50	323	645	1319	232	2196	127	87	504	718	99	1524	146	1769	5006
Apprch %	59.4	25.1	15.5		29.4	60.1	10.6		17.7	12.1	70.2		5.6	86.2	8.3		
Total %	3.8	1.6	1	6.5	12.9	26.3	4.6	43.9	2.5	1.7	10.1	14.3	2	30.4	2.9	35.3	

	Nutmeg Street Southbound				Clinton Keith Road Westbound				Nutmeg Street Northbound				Clinton Keith Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	**28**	12	**10**	**50**	88	161	32	281	14	12	56	82	**18**	**207**	21	**246**	**659**
05:00 PM	21	10	6	37	74	172	**33**	279	**18**	10	**75**	**103**	10	179	15	204	623
05:15 PM	24	**14**	3	41	**89**	171	22	282	18	**15**	60	93	12	199	18	229	645
05:30 PM	27	9	3	39	87	**183**	28	**298**	16	6	50	72	12	193	**22**	227	636
Total Volume	100	45	22	167	338	687	115	1140	66	43	241	350	52	778	76	906	2563
% App. Total	59.9	26.9	13.2		29.6	60.3	10.1		18.9	12.3	68.9		5.7	85.9	8.4		
PHF	.893	.804	.550	.835	.949	.939	.871	.956	.917	.717	.803	.850	.722	.940	.864	.921	.972

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City of Murrieta
N/S: Nutmeg Street
E/W: Clinton Keith Road
Weather: Clear

File Name : 13_MUR_Nutmeg_Clinton Keith PM
Site Code : 04218933
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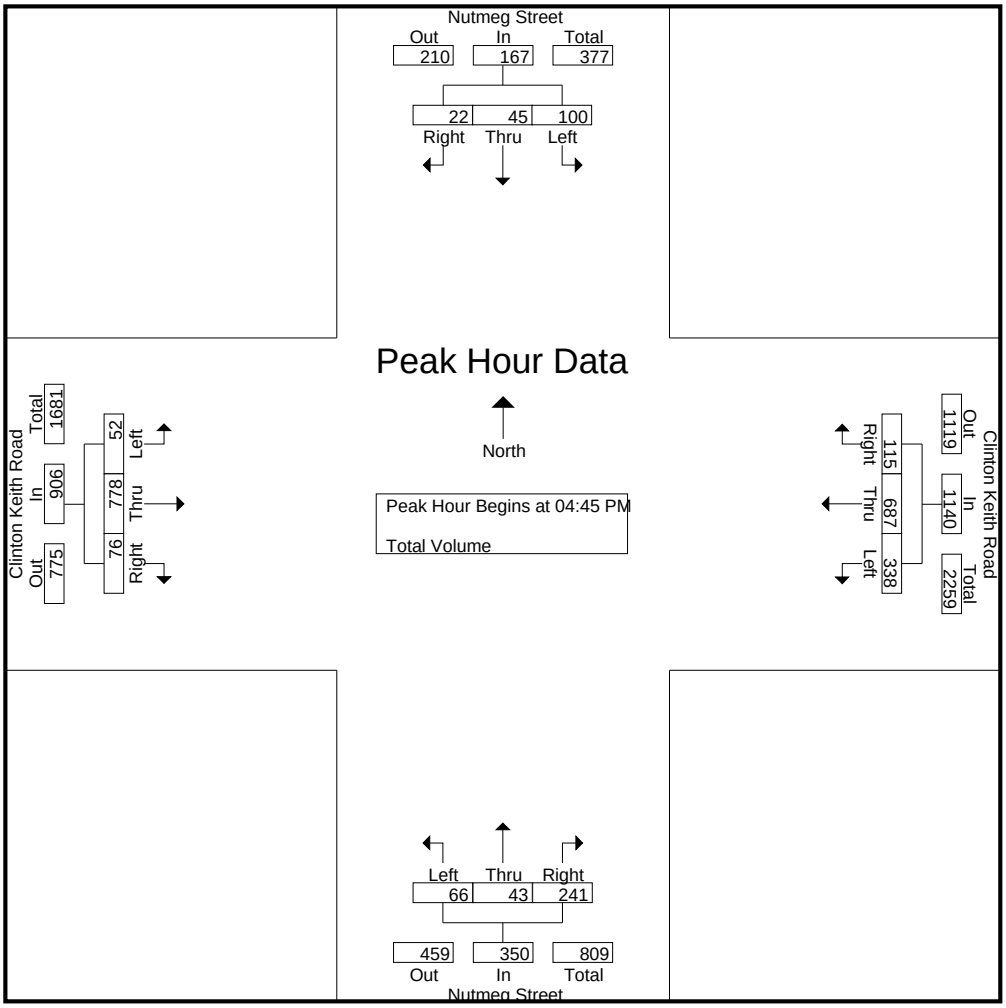

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				05:00 PM				04:15 PM				04:45 PM			
+0 mins.	**29**	11	4	44	74	172	33	279	14	**14**	70	98	**18**	**207**	21	**246**
+15 mins.	22	6	7	35	**89**	171	22	282	15	10	72	97	10	179	15	204
+30 mins.	23	10	9	42	87	**183**	28	**298**	14	12	56	82	12	199	18	229
+45 mins.	28	**12**	**10**	**50**	73	181	**34**	288	**18**	10	**75**	**103**	12	193	**22**	227
Total Volume	102	39	30	171	323	707	117	1147	61	46	273	380	52	778	76	906
% App. Total	59.6	22.8	17.5		28.2	61.6	10.2		16.1	12.1	71.8		5.7	85.9	8.4	
PHF	.879	.813	.750	.855	.907	.966	.860	.962	.847	.821	.910	.922	.722	.940	.864	.921

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County of Riverside
N/S: Leon Road
E/W: Scott Road
Weather: Clear

File Name : 14_CRV_Leon_Scott AM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	Leon Road Southbound				Scott Road Westbound				Leon Road Northbound				Scott Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	4	25	4	33	9	66	0	75	35	5	4	44	5	75	60	140	292
07:15 AM	5	26	2	33	11	72	5	88	51	10	6	67	3	65	65	133	321
07:30 AM	7	22	4	33	9	66	2	77	63	17	7	87	3	66	32	101	298
07:45 AM	7	18	0	25	14	80	7	101	51	22	6	79	6	54	27	87	292
Total	23	91	10	124	43	284	14	341	200	54	23	277	17	260	184	461	1203
08:00 AM	2	17	3	22	9	59	2	70	26	12	4	42	1	48	33	82	216
08:15 AM	2	5	4	11	9	62	3	74	35	5	4	44	2	44	21	67	196
08:30 AM	0	9	3	12	8	52	0	60	27	4	4	35	2	49	20	71	178
08:45 AM	1	9	0	10	2	57	2	61	29	1	4	34	2	40	22	64	169
Total	5	40	10	55	28	230	7	265	117	22	16	155	7	181	96	284	759
Grand Total	28	131	20	179	71	514	21	606	317	76	39	432	24	441	280	745	1962
Apprch %	15.6	73.2	11.2		11.7	84.8	3.5		73.4	17.6	9		3.2	59.2	37.6		
Total %	1.4	6.7	1	9.1	3.6	26.2	1.1	30.9	16.2	3.9	2	22	1.2	22.5	14.3	38	

	Leon Road Southbound				Scott Road Westbound				Leon Road Northbound				Scott Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	4	25	**4**	**33**	9	66	0	75	35	5	4	44	5	**75**	60	**140**	292
07:15 AM	5	**26**	2	33	11	72	5	88	51	10	6	67	3	65	**65**	133	**321**
07:30 AM	**7**	22	4	33	9	66	2	77	**63**	17	**7**	**87**	3	66	32	101	298
07:45 AM	7	18	0	25	**14**	**80**	**7**	**101**	51	**22**	6	79	**6**	54	27	87	292
Total Volume	23	91	10	124	43	284	14	341	200	54	23	277	17	260	184	461	1203
% App. Total	18.5	73.4	8.1		12.6	83.3	4.1		72.2	19.5	8.3		3.7	56.4	39.9		
PHF	.821	.875	.625	.939	.768	.888	.500	.844	.794	.614	.821	.796	.708	.867	.708	.823	.937

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County of Riverside
N/S: Leon Road
E/W: Scott Road
Weather: Clear

File Name : 14_CRV_Leon_Scott AM
Site Code : 04218933
Start Date : 12/12/2018
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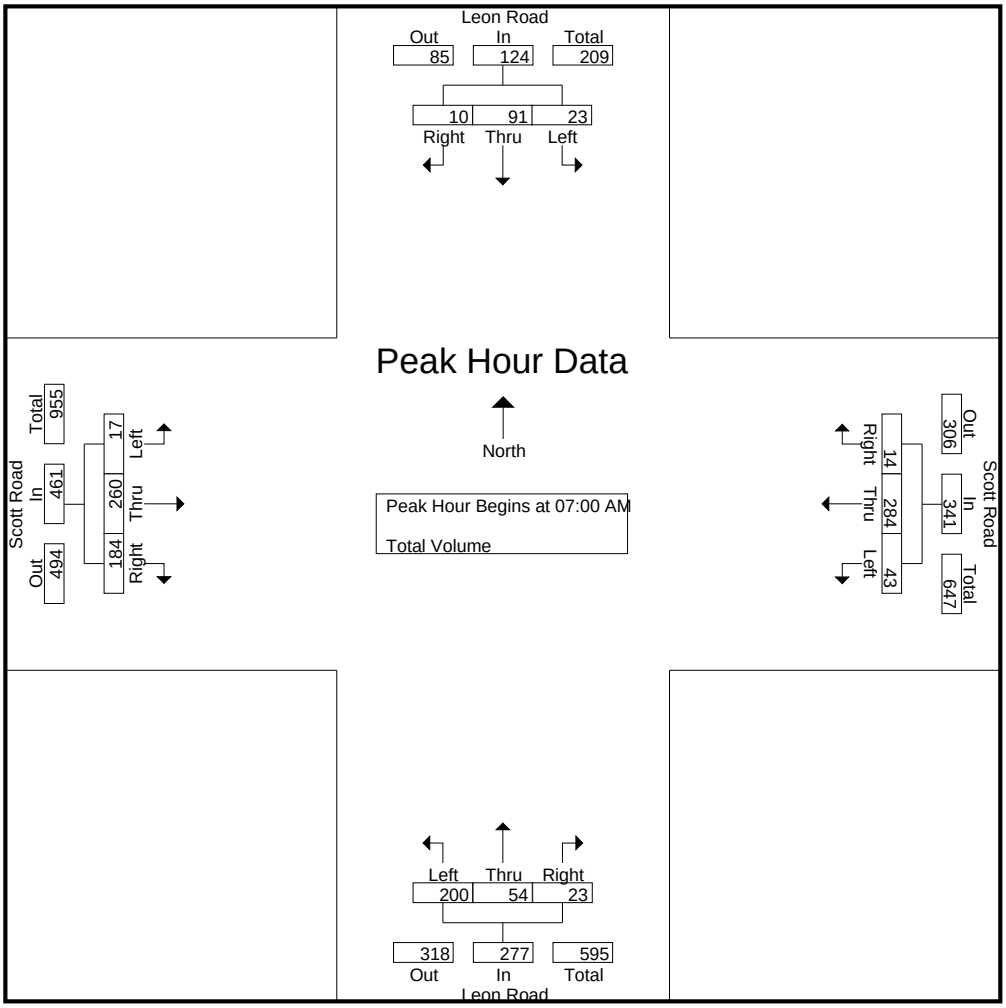

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM				07:00 AM				07:00 AM				07:00 AM			
+0 mins.	4	25	**4**	**33**	9	66	0	75	35	5	4	44	5	**75**	60	**140**
+15 mins.	5	**26**	2	33	11	72	5	88	51	10	6	67	3	65	**65**	133
+30 mins.	**7**	22	4	33	9	66	2	77	**63**	17	**7**	**87**	3	66	32	101
+45 mins.	7	18	0	25	**14**	**80**	**7**	**101**	51	**22**	6	79	**6**	54	27	87
Total Volume	23	91	10	124	43	284	14	341	200	54	23	277	17	260	184	461
% App. Total	18.5	73.4	8.1		12.6	83.3	4.1		72.2	19.5	8.3		3.7	56.4	39.9	
PHF	.821	.875	.625	.939	.768	.888	.500	.844	.794	.614	.821	.796	.708	.867	.708	.823

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County of Riverside
N/S: Leon Road
E/W: Scott Road
Weather: Clear

File Name : 14_CRV_Leon_Scott PM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	Leon Road Southbound				Scott Road Westbound				Leon Road Northbound				Scott Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	4	5	2	11	1	97	5	103	33	12	12	57	5	87	31	123	294
04:15 PM	5	2	5	12	7	93	9	109	33	11	8	52	3	75	26	104	277
04:30 PM	2	7	2	11	7	61	2	70	17	9	7	33	3	85	21	109	223
04:45 PM	1	9	0	10	1	64	5	70	41	17	8	66	4	60	35	99	245
Total	12	23	9	44	16	315	21	352	124	49	35	208	15	307	113	435	1039
05:00 PM	4	8	2	14	1	85	2	88	34	3	8	45	2	71	21	94	241
05:15 PM	3	9	4	16	3	73	5	81	35	14	10	59	3	75	27	105	261
05:30 PM	1	5	0	6	3	88	1	92	21	10	13	44	3	84	24	111	253
05:45 PM	3	4	3	10	2	58	2	62	26	12	6	44	1	58	24	83	199
Total	11	26	9	46	9	304	10	323	116	39	37	192	9	288	96	393	954
Grand Total	23	49	18	90	25	619	31	675	240	88	72	400	24	595	209	828	1993
Apprch %	25.6	54.4	20		3.7	91.7	4.6		60	22	18		2.9	71.9	25.2		
Total %	1.2	2.5	0.9	4.5	1.3	31.1	1.6	33.9	12	4.4	3.6	20.1	1.2	29.9	10.5	41.5	

	Leon Road Southbound				Scott Road Westbound				Leon Road Northbound				Scott Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	4	5	2	11	1	**97**	5	103	33	12	**12**	57	**5**	**87**	31	**123**	**294**
04:15 PM	**5**	2	**5**	**12**	**7**	93	**9**	**109**	33	11	8	52	3	75	26	104	277
04:30 PM	2	7	2	11	7	61	2	70	17	9	7	33	3	85	21	109	223
04:45 PM	1	**9**	0	10	1	64	5	70	**41**	**17**	8	**66**	4	60	**35**	99	245
Total Volume	12	23	9	44	16	315	21	352	124	49	35	208	15	307	113	435	1039
% App. Total	27.3	52.3	20.5		4.5	89.5	6		59.6	23.6	16.8		3.4	70.6	26		
PHF	.600	.639	.450	.917	.571	.812	.583	.807	.756	.721	.729	.788	.750	.882	.807	.884	.884

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County of Riverside
N/S: Leon Road
E/W: Scott Road
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File Name : 14_CRV_Leon_Scott PM
Site Code : 04218933
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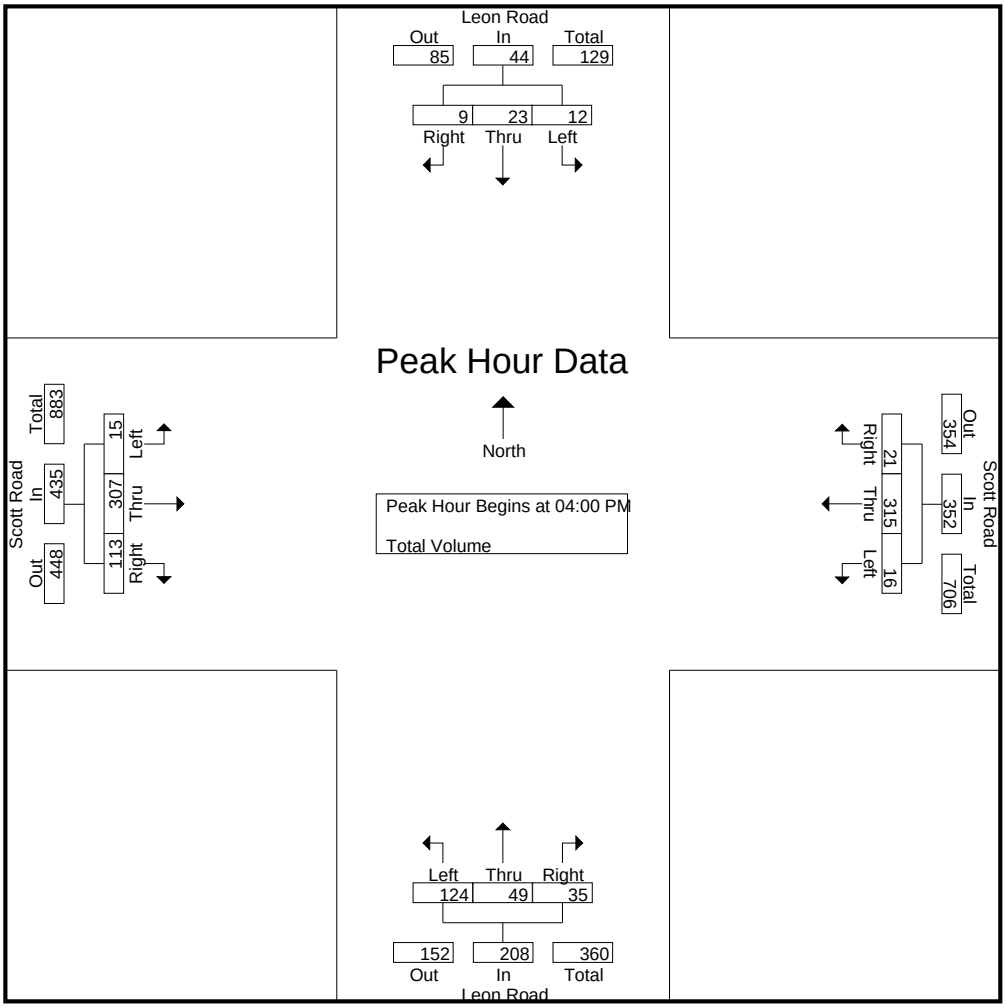

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:00 PM				04:45 PM				04:00 PM			
+0 mins.	2	7	2	11	1	**97**	5	103	**41**	**17**	8	**66**	**5**	**87**	31	**123**
+15 mins.	1	**9**	0	10	**7**	93	**9**	**109**	34	3	8	45	3	75	26	104
+30 mins.	**4**	8	2	14	7	61	2	70	35	14	10	59	3	85	21	109
+45 mins.	3	9	**4**	**16**	1	64	5	70	21	10	**13**	44	4	60	**35**	99
Total Volume	10	33	8	51	16	315	21	352	131	44	39	214	15	307	113	435
% App. Total	19.6	64.7	15.7		4.5	89.5	6		61.2	20.6	18.2		3.4	70.6	26	
PHF	.625	.917	.500	.797	.571	.812	.583	.807	.799	.647	.750	.811	.750	.882	.807	.884

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City of Murrieta
N/S: Mitchell Road/Murrieta Oaks Avenue
E/W: Clinton Keith Road
Weather: Clear

File Name : 15_MUR_Mitchell_Mur Oaks_Clinton Keith AM
Site Code : 04218933
Start Date : 12/12/2018
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Groups Printed- Total Volume

	Mitchell Road Southbound				Clinton Keith Road Westbound				Murrieta Oaks Avenue Northbound				Clinton Keith Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	3	3	18	278	14	310	8	0	45	53	5	444	11	460	826
07:15 AM	3	1	4	8	24	320	8	352	5	0	44	49	6	377	5	388	797
07:30 AM	2	0	4	6	22	325	5	352	10	0	25	35	1	383	14	398	791
07:45 AM	1	3	7	11	25	311	5	341	7	0	28	35	4	333	23	360	747
Total	6	4	18	28	89	1234	32	1355	30	0	142	172	16	1537	53	1606	3161
08:00 AM	0	16	10	26	61	323	2	386	9	2	52	63	1	273	81	355	830
08:15 AM	6	14	6	26	52	307	1	360	26	5	69	100	4	270	73	347	833
08:30 AM	2	1	4	7	20	286	1	307	32	3	53	88	8	360	15	383	785
08:45 AM	2	0	1	3	18	269	2	289	7	1	22	30	5	291	6	302	624
Total	10	31	21	62	151	1185	6	1342	74	11	196	281	18	1194	175	1387	3072
Grand Total	16	35	39	90	240	2419	38	2697	104	11	338	453	34	2731	228	2993	6233
Apprch %	17.8	38.9	43.3		8.9	89.7	1.4		23	2.4	74.6		1.1	91.2	7.6		
Total %	0.3	0.6	0.6	1.4	3.9	38.8	0.6	43.3	1.7	0.2	5.4	7.3	0.5	43.8	3.7	48	

	Mitchell Road Southbound				Clinton Keith Road Westbound				Murrieta Oaks Avenue Northbound				Clinton Keith Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	2	0	4	6	22	**325**	**5**	352	10	0	25	35	1	**383**	14	**398**	791
07:45 AM	1	3	7	11	25	311	5	341	7	0	28	35	**4**	333	23	360	747
08:00 AM	0	**16**	**10**	**26**	**61**	323	2	**386**	9	2	52	63	1	273	**81**	355	830
08:15 AM	**6**	14	6	26	52	307	1	360	**26**	**5**	**69**	**100**	4	270	73	347	**833**
Total Volume	9	33	27	69	160	1266	13	1439	52	7	174	233	10	1259	191	1460	3201
% App. Total	13	47.8	39.1		11.1	88	0.9		22.3	3	74.7		0.7	86.2	13.1		
PHF	.375	.516	.675	.663	.656	.974	.650	.932	.500	.350	.630	.583	.625	.822	.590	.917	.961

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City of Murrieta
N/S: Mitchell Road/Murrieta Oaks Avenue
E/W: Clinton Keith Road
Weather: Clear

File Name : 15_MUR_Mitchell_Mur Oaks_Clinton Keith AM
Site Code : 04218933
Start Date : 12/12/2018
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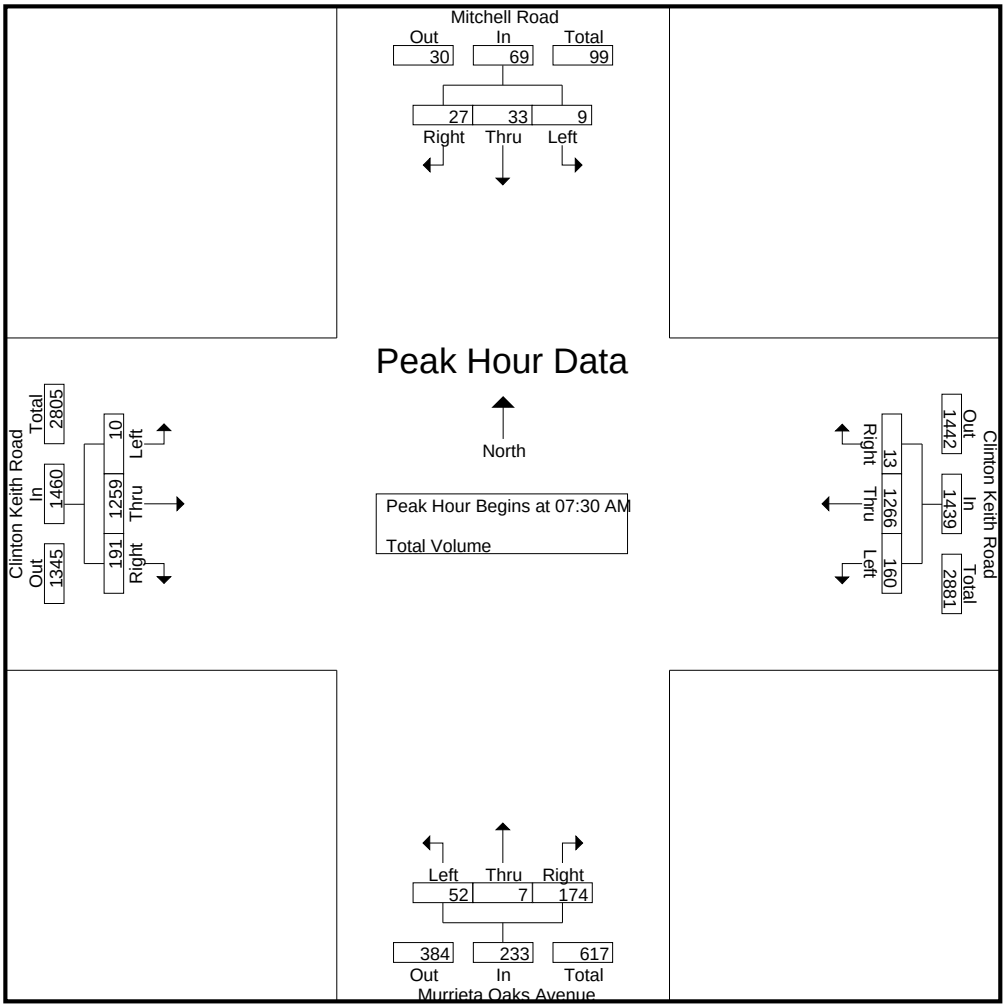

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:45 AM				07:30 AM				07:45 AM				07:00 AM			
+0 mins.	1	3	7	11	22	**325**	**5**	352	7	0	28	35	5	**444**	11	**460**
+15 mins.	0	**16**	**10**	**26**	25	311	5	341	9	2	52	63	**6**	377	5	388
+30 mins.	**6**	14	6	26	**61**	323	2	**386**	26	**5**	**69**	**100**	1	383	14	398
+45 mins.	2	1	4	7	52	307	1	360	**32**	3	53	88	4	333	**23**	360
Total Volume	9	34	27	70	160	1266	13	1439	74	10	202	286	16	1537	53	1606
% App. Total	12.9	48.6	38.6		11.1	88	0.9		25.9	3.5	70.6		1	95.7	3.3	
PHF	.375	.531	.675	.673	.656	.974	.650	.932	.578	.500	.732	.715	.667	.865	.576	.873

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City of Murrieta
N/S: Mitchell Road/Murrieta Oaks Avenue
E/W: Clinton Keith Road
Weather: Clear

File Name : 15_MUR_Mitchell_Mur Oaks_Clinton Keith PM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	Mitchell Road Southbound				Clinton Keith Road Westbound				Murrieta Oaks Avenue Northbound				Clinton Keith Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	14	0	8	22	32	349	2	383	8	0	29	37	8	358	10	376	818
04:15 PM	9	1	4	14	24	345	2	371	3	0	23	26	8	429	10	447	858
04:30 PM	4	1	5	10	28	330	1	359	6	0	18	24	4	366	5	375	768
04:45 PM	1	0	6	7	33	345	1	379	8	0	36	44	12	421	5	438	868
Total	28	2	23	53	117	1369	6	1492	25	0	106	131	32	1574	30	1636	3312
05:00 PM	1	1	5	7	30	373	0	403	11	0	28	39	5	408	4	417	866
05:15 PM	2	1	2	5	26	342	1	369	3	1	24	28	8	445	7	460	862
05:30 PM	1	1	1	3	36	379	0	415	6	1	18	25	4	427	7	438	881
05:45 PM	0	0	5	5	32	381	1	414	6	0	26	32	12	382	7	401	852
Total	4	3	13	20	124	1475	2	1601	26	2	96	124	29	1662	25	1716	3461
Grand Total	32	5	36	73	241	2844	8	3093	51	2	202	255	61	3236	55	3352	6773
Apprch %	43.8	6.8	49.3		7.8	91.9	0.3		20	0.8	79.2		1.8	96.5	1.6		
Total %	0.5	0.1	0.5	1.1	3.6	42	0.1	45.7	0.8	0	3	3.8	0.9	47.8	0.8	49.5	

	Mitchell Road Southbound				Clinton Keith Road Westbound				Murrieta Oaks Avenue Northbound				Clinton Keith Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	1	0	**6**	**7**	33	345	**1**	379	8	0	**36**	**44**	**12**	421	5	438	868
05:00 PM	1	**1**	5	7	30	373	0	403	**11**	0	28	39	5	408	4	417	866
05:15 PM	**2**	1	2	5	26	342	1	369	3	**1**	24	28	8	**445**	**7**	**460**	862
05:30 PM	1	1	1	3	**36**	**379**	0	**415**	6	1	18	25	4	427	7	438	**881**
Total Volume	5	3	14	22	125	1439	2	1566	28	2	106	136	29	1701	23	1753	3477
% App. Total	22.7	13.6	63.6		8	91.9	0.1		20.6	1.5	77.9		1.7	97	1.3		
PHF	.625	.750	.583	.786	.868	.949	.500	.943	.636	.500	.736	.773	.604	.956	.821	.953	.987

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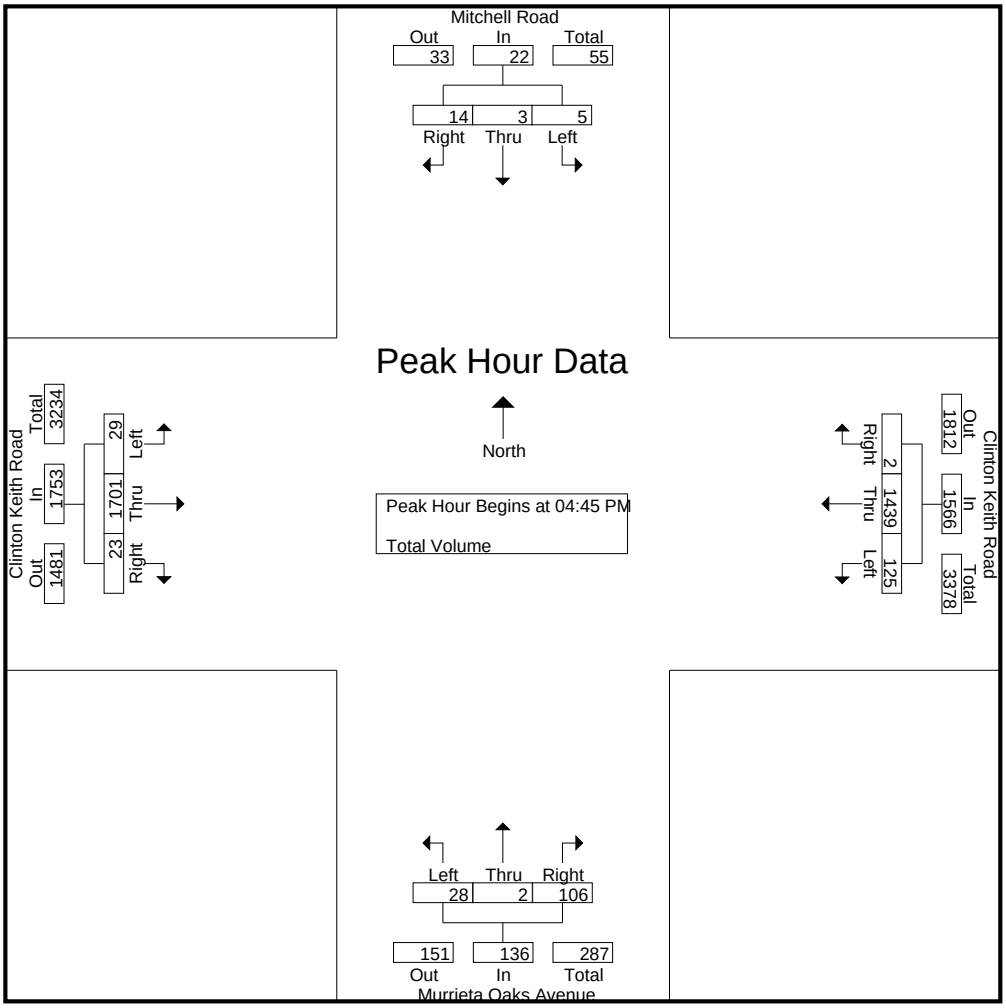
City of Murrieta
N/S: Mitchell Road/Murrieta Oaks Avenue
E/W: Clinton Keith Road
Weather: Clear

File Name : 15_MUR_Mitchell_Mur Oaks_Clinton Keith PM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				05:00 PM				04:45 PM				04:45 PM			
+0 mins.	**14**	0	**8**	**22**	30	373	0	403	8	0	**36**	**44**	**12**	421	5	438
+15 mins.	9	**1**	4	14	26	342	**1**	369	**11**	0	28	39	5	408	4	417
+30 mins.	4	1	5	10	**36**	379	0	**415**	3	**1**	24	28	8	**445**	**7**	**460**
+45 mins.	1	0	6	7	32	**381**	1	414	6	1	18	25	4	427	7	438
Total Volume	28	2	23	53	124	1475	2	1601	28	2	106	136	29	1701	23	1753
% App. Total	52.8	3.8	43.4		7.7	92.1	0.1		20.6	1.5	77.9		1.7	97	1.3	
PHF	.500	.500	.719	.602	.861	.968	.500	.964	.636	.500	.736	.773	.604	.956	.821	.953

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City of Murrieta
N/S: I-215 Northbound Ramps
E/W: Clinton Keith Road
Weather: Clear

File Name : 16_MUR_215N_Clinton Keith AM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	I-215 Northbound On Ramp Southbound				Clinton Keith Road Westbound				I-215 Northbound Ramps Northbound				Clinton Keith Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	0	0	0	314	73	387	27	0	242	269	0	298	167	465	1121
07:15 AM	0	0	0	0	0	376	85	461	46	0	161	207	0	203	174	377	1045
07:30 AM	0	0	0	0	0	353	58	411	38	0	54	92	0	146	188	334	837
07:45 AM	0	0	0	0	0	275	51	326	55	0	67	122	0	135	159	294	742
Total	0	0	0	0	0	1318	267	1585	166	0	524	690	0	782	688	1470	3745
08:00 AM	0	0	0	0	0	258	26	284	46	0	54	100	0	119	113	232	616
08:15 AM	0	0	0	0	0	305	48	353	49	0	45	94	0	140	122	262	709
08:30 AM	0	0	0	0	0	234	38	272	55	0	66	121	0	144	152	296	689
08:45 AM	0	0	0	0	0	218	32	250	60	0	64	124	0	127	132	259	633
Total	0	0	0	0	0	1015	144	1159	210	0	229	439	0	530	519	1049	2647
Grand Total	0	0	0	0	0	2333	411	2744	376	0	753	1129	0	1312	1207	2519	6392
Apprch %	0	0	0		0	85	15		33.3	0	66.7		0	52.1	47.9		
Total %	0	0	0	0	0	36.5	6.4	42.9	5.9	0	11.8	17.7	0	20.5	18.9	39.4	

	I-215 Northbound On Ramp Southbound				Clinton Keith Road Westbound				I-215 Northbound Ramps Northbound				Clinton Keith Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	314	73	387	27	0	**242**	**269**	0	**298**	167	**465**	**1121**
07:15 AM	0	0	0	0	0	**376**	**85**	**461**	46	0	161	207	0	203	174	377	1045
07:30 AM	0	0	0	0	0	353	58	411	38	0	54	92	0	146	**188**	334	837
07:45 AM	0	0	0	0	0	275	51	326	**55**	0	67	122	0	135	159	294	742
Total Volume	0	0	0	0	0	1318	267	1585	166	0	524	690	0	782	688	1470	3745
% App. Total	0	0	0		0	83.2	16.8		24.1	0	75.9		0	53.2	46.8		
PHF	.000	.000	.000	.000	.000	.876	.785	.860	.755	.000	.541	.641	.000	.656	.915	.790	.835

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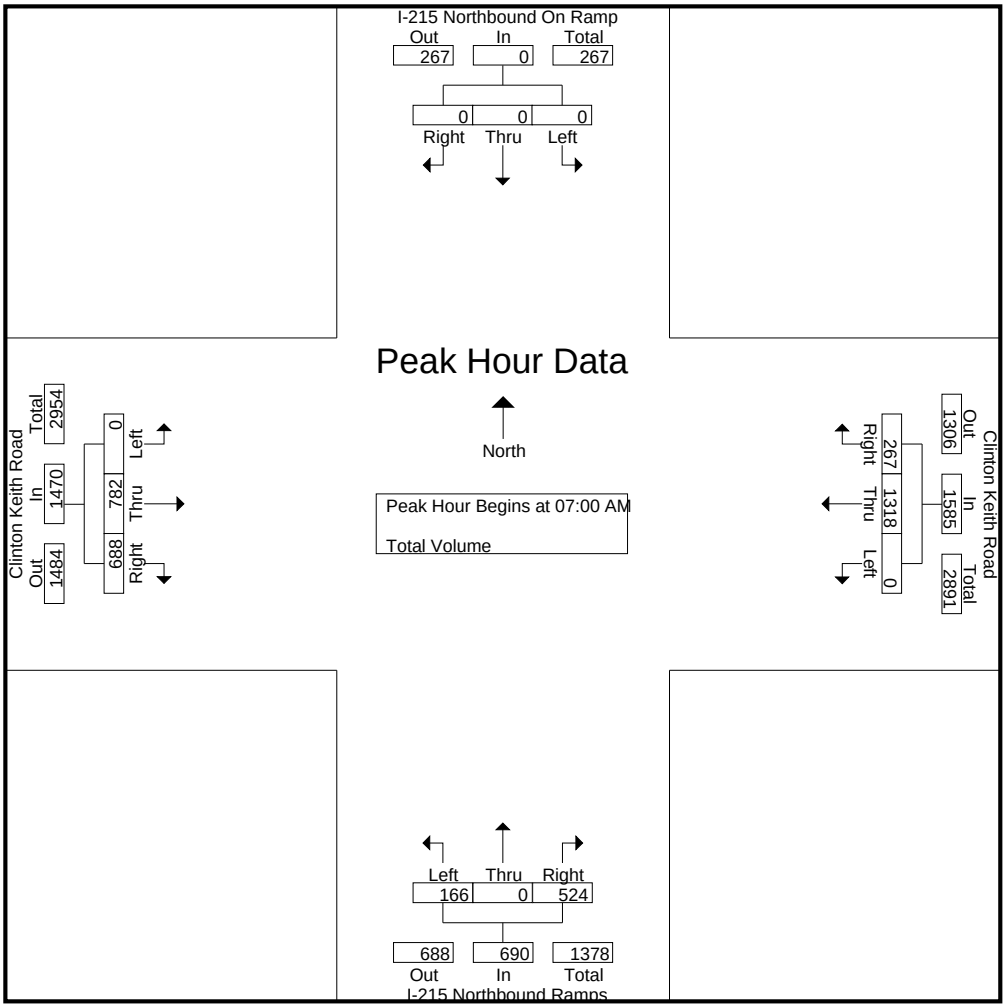
City of Murrieta
N/S: I-215 Northbound Ramps
E/W: Clinton Keith Road
Weather: Clear

File Name : 16_MUR_215N_Clinton Keith AM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM				07:00 AM				07:00 AM				07:00 AM			
+0 mins.	0	0	0	0	0	314	73	387	27	0	**242**	**269**	0	**298**	167	**465**
+15 mins.	0	0	0	0	0	**376**	**85**	**461**	46	0	161	207	0	203	174	377
+30 mins.	0	0	0	0	0	353	58	411	38	0	54	92	0	146	**188**	334
+45 mins.	0	0	0	0	0	275	51	326	**55**	0	67	122	0	135	159	294
Total Volume	0	0	0	0	0	1318	267	1585	166	0	524	690	0	782	688	1470
% App. Total	0	0	0		0	83.2	16.8		24.1	0	75.9		0	53.2	46.8	
PHF	.000	.000	.000	.000	.000	.876	.785	.860	.755	.000	.541	.641	.000	.656	.915	.790

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City of Murrieta
N/S: I-215 Northbound Ramps
E/W: Clinton Keith Road
Weather: Clear

File Name : 16_MUR_215N_Clinton Keith PM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	I-215 Northbound On Ramp Southbound				Clinton Keith Road Westbound				I-215 Northbound Ramps Northbound				Clinton Keith Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	0	0	0	0	211	14	225	87	0	96	183	0	206	129	335	743
04:15 PM	0	0	0	0	0	201	17	218	101	0	131	232	0	225	144	369	819
04:30 PM	0	0	0	0	0	191	20	211	82	0	147	229	0	196	105	301	741
04:45 PM	0	0	0	0	0	211	26	237	94	0	141	235	0	269	111	380	852
Total	0	0	0	0	0	814	77	891	364	0	515	879	0	896	489	1385	3155
05:00 PM	0	0	0	0	0	222	25	247	97	0	140	237	0	242	115	357	841
05:15 PM	0	0	0	0	0	190	23	213	89	0	136	225	0	271	140	411	849
05:30 PM	0	0	0	0	0	208	13	221	94	0	130	224	0	253	121	374	819
05:45 PM	0	0	0	0	0	181	18	199	104	0	117	221	0	225	111	336	756
Total	0	0	0	0	0	801	79	880	384	0	523	907	0	991	487	1478	3265
Grand Total	0	0	0	0	0	1615	156	1771	748	0	1038	1786	0	1887	976	2863	6420
Apprch %	0	0	0		0	91.2	8.8		41.9	0	58.1		0	65.9	34.1		
Total %	0	0	0	0	0	25.2	2.4	27.6	11.7	0	16.2	27.8	0	29.4	15.2	44.6	

	I-215 Northbound On Ramp Southbound				Clinton Keith Road Westbound				I-215 Northbound Ramps Northbound				Clinton Keith Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	0	0	0	0	211	**26**	237	94	0	**141**	235	0	269	111	380	**852**
05:00 PM	0	0	0	0	0	**222**	25	**247**	**97**	0	140	**237**	0	242	115	357	841
05:15 PM	0	0	0	0	0	190	23	213	89	0	136	225	0	**271**	**140**	**411**	849
05:30 PM	0	0	0	0	0	208	13	221	94	0	130	224	0	253	121	374	819
Total Volume	0	0	0	0	0	831	87	918	374	0	547	921	0	1035	487	1522	3361
% App. Total	0	0	0		0	90.5	9.5		40.6	0	59.4		0	68	32		
PHF	.000	.000	.000	.000	.000	.936	.837	.929	.964	.000	.970	.972	.000	.955	.870	.926	.986

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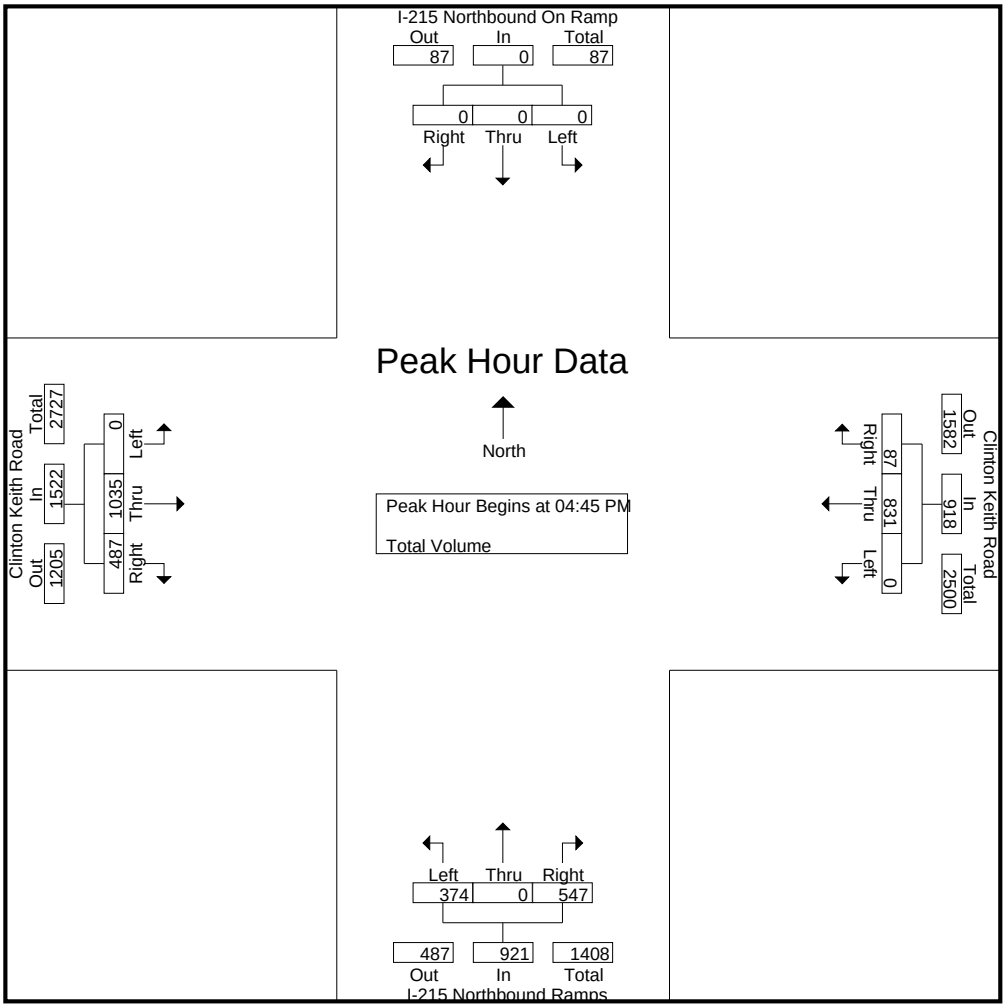
City of Murrieta
N/S: I-215 Northbound Ramps
E/W: Clinton Keith Road
Weather: Clear

File Name : 16_MUR_215N_Clinton Keith PM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				04:45 PM				04:15 PM				04:45 PM			
+0 mins.	0	0	0	0	0	211	**26**	237	**101**	0	131	232	0	269	111	380
+15 mins.	0	0	0	0	0	**222**	25	**247**	82	0	**147**	229	0	242	115	357
+30 mins.	0	0	0	0	0	190	23	213	94	0	141	235	0	**271**	**140**	**411**
+45 mins.	0	0	0	0	0	208	13	221	97	0	140	**237**	0	253	121	374
Total Volume	0	0	0	0	0	831	87	918	374	0	559	933	0	1035	487	1522
% App. Total	0	0	0		0	90.5	9.5		40.1	0	59.9		0	68	32	
PHF	.000	.000	.000	.000	.000	.936	.837	.929	.926	.000	.951	.984	.000	.955	.870	.926

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City of Murrieta
N/S: Whitewood Road
E/W: Clinton Keith Road
Weather: Clear

File Name : 17_MUR_Whitewood_Clinton Keith AM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	Whitewood Road Southbound				Clinton Keith Road Westbound				Whitewood Road Northbound				Clinton Keith Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	23	63	90	176	95	293	35	423	48	12	15	75	62	159	69	290	964
07:15 AM	33	85	77	195	100	235	24	359	38	24	20	82	75	172	59	306	942
07:30 AM	20	72	100	192	25	179	15	219	22	34	30	86	85	162	26	273	770
07:45 AM	14	82	72	168	39	174	20	233	11	27	16	54	65	109	14	188	643
Total	90	302	339	731	259	881	94	1234	119	97	81	297	287	602	168	1057	3319
08:00 AM	20	75	107	202	35	156	17	208	28	20	14	62	70	80	29	179	651
08:15 AM	15	69	76	160	39	206	10	255	29	22	20	71	59	96	32	187	673
08:30 AM	10	58	85	153	35	186	19	240	14	29	20	63	67	95	23	185	641
08:45 AM	10	73	82	165	38	122	9	169	21	26	12	59	66	81	23	170	563
Total	55	275	350	680	147	670	55	872	92	97	66	255	262	352	107	721	2528
Grand Total	145	577	689	1411	406	1551	149	2106	211	194	147	552	549	954	275	1778	5847
Apprch %	10.3	40.9	48.8		19.3	73.6	7.1		38.2	35.1	26.6		30.9	53.7	15.5		
Total %	2.5	9.9	11.8	24.1	6.9	26.5	2.5	36	3.6	3.3	2.5	9.4	9.4	16.3	4.7	30.4	

	Whitewood Road Southbound				Clinton Keith Road Westbound				Whitewood Road Northbound				Clinton Keith Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	23	63	90	176	95	**293**	**35**	**423**	**48**	12	15	75	62	159	**69**	290	**964**
07:15 AM	**33**	**85**	77	**195**	**100**	235	24	359	38	24	20	82	75	**172**	59	**306**	942
07:30 AM	20	72	**100**	192	25	179	15	219	22	**34**	**30**	**86**	**85**	162	26	273	770
07:45 AM	14	82	72	168	39	174	20	233	11	27	16	54	65	109	14	188	643
Total Volume	90	302	339	731	259	881	94	1234	119	97	81	297	287	602	168	1057	3319
% App. Total	12.3	41.3	46.4		21	71.4	7.6		40.1	32.7	27.3		27.2	57	15.9		
PHF	.682	.888	.848	.937	.648	.752	.671	.729	.620	.713	.675	.863	.844	.875	.609	.864	.861

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City of Murrieta
N/S: Whitewood Road
E/W: Clinton Keith Road
Weather: Clear

File Name : 17_MUR_Whitewood_Clinton Keith AM
Site Code : 04218933
Start Date : 12/12/2018
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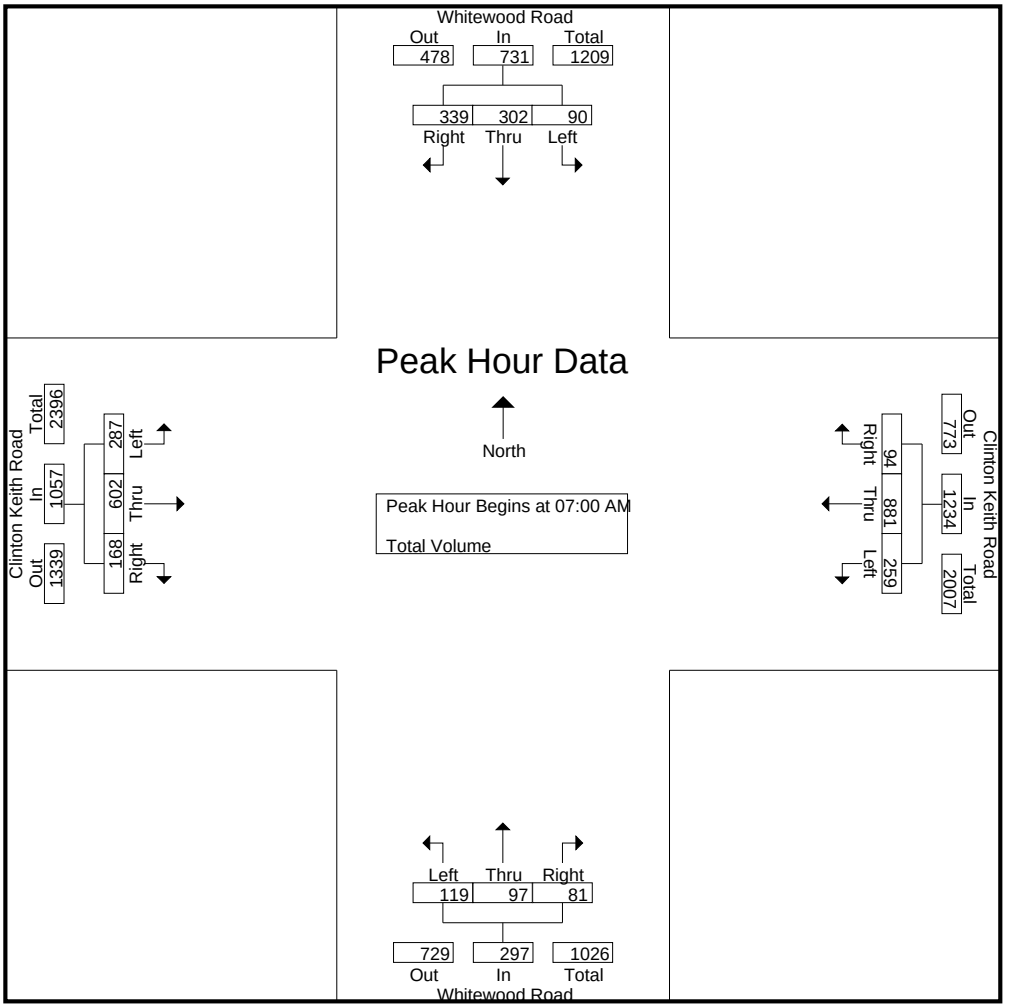

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:15 AM				07:00 AM				07:00 AM				07:00 AM			
+0 mins.	**33**	**85**	77	195	95	**293**	**35**	**423**	**48**	12	15	75	62	159	**69**	290
+15 mins.	20	72	100	192	**100**	235	24	359	38	24	20	82	75	**172**	59	**306**
+30 mins.	14	82	72	168	25	179	15	219	22	**34**	**30**	**86**	**85**	162	26	273
+45 mins.	20	75	**107**	**202**	39	174	20	233	11	27	16	54	65	109	14	188
Total Volume	87	314	356	757	259	881	94	1234	119	97	81	297	287	602	168	1057
% App. Total	11.5	41.5	47		21	71.4	7.6		40.1	32.7	27.3		27.2	57	15.9	
PHF	.659	.924	.832	.937	.648	.752	.671	.729	.620	.713	.675	.863	.844	.875	.609	.864

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City of Murrieta
N/S: Whitewood Road
E/W: Clinton Keith Road
Weather: Clear

File Name : 17_MUR_Whitewood_Clinton Keith PM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	Whitewood Road Southbound				Clinton Keith Road Westbound				Whitewood Road Northbound				Clinton Keith Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	24	53	68	145	22	118	17	157	32	116	24	172	98	181	26	305	779
04:15 PM	22	58	72	152	25	88	14	127	27	97	31	155	140	168	40	348	782
04:30 PM	24	66	75	165	28	95	18	141	31	121	27	179	153	162	33	348	833
04:45 PM	18	73	71	162	35	98	13	146	45	134	31	210	168	185	62	415	933
Total	88	250	286	624	110	399	62	571	135	468	113	716	559	696	161	1416	3327
05:00 PM	22	56	79	157	20	116	17	153	45	120	36	201	154	184	44	382	893
05:15 PM	21	54	58	133	28	124	21	173	41	126	40	207	150	189	54	393	906
05:30 PM	21	63	64	148	19	101	19	139	34	133	21	188	142	203	42	387	862
05:45 PM	15	46	66	127	20	125	13	158	38	136	30	204	153	146	37	336	825
Total	79	219	267	565	87	466	70	623	158	515	127	800	599	722	177	1498	3486
Grand Total	167	469	553	1189	197	865	132	1194	293	983	240	1516	1158	1418	338	2914	6813
Apprch %	14	39.4	46.5		16.5	72.4	11.1		19.3	64.8	15.8		39.7	48.7	11.6		
Total %	2.5	6.9	8.1	17.5	2.9	12.7	1.9	17.5	4.3	14.4	3.5	22.3	17	20.8	5	42.8	

	Whitewood Road Southbound				Clinton Keith Road Westbound				Whitewood Road Northbound				Clinton Keith Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	18	**73**	71	**162**	**35**	98	13	146	**45**	**134**	31	**210**	**168**	185	**62**	**415**	**933**
05:00 PM	**22**	56	**79**	157	20	116	17	153	45	120	36	201	154	184	44	382	893
05:15 PM	21	54	58	133	28	**124**	**21**	**173**	41	126	**40**	207	150	189	54	393	906
05:30 PM	21	63	64	148	19	101	19	139	34	133	21	188	142	**203**	42	387	862
Total Volume	82	246	272	600	102	439	70	611	165	513	128	806	614	761	202	1577	3594
% App. Total	13.7	41	45.3		16.7	71.8	11.5		20.5	63.6	15.9		38.9	48.3	12.8		
PHF	.932	.842	.861	.926	.729	.885	.833	.883	.917	.957	.800	.960	.914	.937	.815	.950	.963

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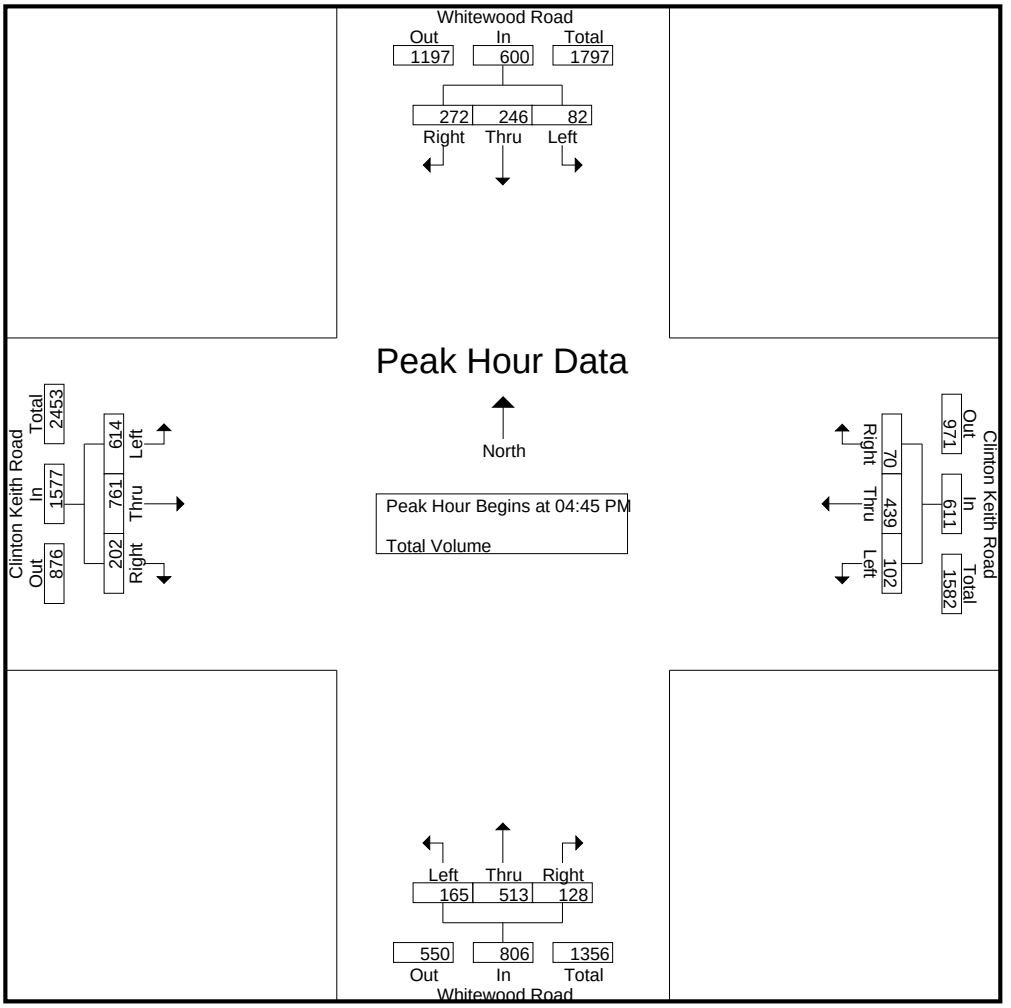
City of Murrieta
N/S: Whitewood Road
E/W: Clinton Keith Road
Weather: Clear

File Name : 17_MUR_Whitewood_Clinton Keith PM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:15 PM				05:00 PM				04:45 PM				04:45 PM			
+0 mins.	22	58	72	152	20	116	17	153	**45**	**134**	31	**210**	**168**	185	**62**	**415**
+15 mins.	**24**	66	75	**165**	**28**	124	**21**	**173**	45	120	36	201	154	184	44	382
+30 mins.	18	**73**	71	162	19	101	19	139	41	126	**40**	207	150	189	54	393
+45 mins.	22	56	**79**	157	20	**125**	13	158	34	133	21	188	142	**203**	42	387
Total Volume	86	253	297	636	87	466	70	623	165	513	128	806	614	761	202	1577
% App. Total	13.5	39.8	46.7		14	74.8	11.2		20.5	63.6	15.9		38.9	48.3	12.8	
PHF	.896	.866	.940	.964	.777	.932	.833	.900	.917	.957	.800	.960	.914	.937	.815	.950

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City of Murrieta
N/S: Jefferson Avenue
E/W: Ivy Street/Los Alamos Road
Weather: Clear

File Name : 18_MUR_Jefferson_Ivy_Los Alamos AM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	Jefferson Avenue Southbound				Los Alamos Road Westbound				Jefferson Avenue Northbound				Ivy Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	15	57	5	77	38	41	39	118	7	30	14	51	6	30	12	48	294
07:15 AM	26	79	8	113	42	34	30	106	15	37	9	61	4	47	18	69	349
07:30 AM	34	97	6	137	51	49	33	133	10	29	11	50	7	38	15	60	380
07:45 AM	33	109	7	149	79	55	45	179	35	37	10	82	7	44	32	83	493
Total	108	342	26	476	210	179	147	536	67	133	44	244	24	159	77	260	1516
08:00 AM	31	102	12	145	68	58	51	177	34	38	11	83	7	37	20	64	469
08:15 AM	39	105	9	153	55	51	40	146	23	56	10	89	8	44	33	85	473
08:30 AM	51	120	12	183	52	34	42	128	33	44	7	84	11	40	46	97	492
08:45 AM	43	137	13	193	61	45	33	139	23	55	26	104	9	26	29	64	500
Total	164	464	46	674	236	188	166	590	113	193	54	360	35	147	128	310	1934
Grand Total	272	806	72	1150	446	367	313	1126	180	326	98	604	59	306	205	570	3450
Apprch %	23.7	70.1	6.3		39.6	32.6	27.8		29.8	54	16.2		10.4	53.7	36		
Total %	7.9	23.4	2.1	33.3	12.9	10.6	9.1	32.6	5.2	9.4	2.8	17.5	1.7	8.9	5.9	16.5	

	Jefferson Avenue Southbound				Los Alamos Road Westbound				Jefferson Avenue Northbound				Ivy Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	31	102	12	145	**68**	**58**	**51**	**177**	**34**	38	11	83	7	37	20	64	469
08:15 AM	39	105	9	153	55	51	40	146	23	**56**	10	89	8	**44**	33	85	473
08:30 AM	**51**	120	12	183	52	34	42	128	33	44	7	84	**11**	40	**46**	**97**	492
08:45 AM	43	**137**	**13**	**193**	61	45	33	139	23	55	**26**	**104**	9	26	29	64	**500**
Total Volume	164	464	46	674	236	188	166	590	113	193	54	360	35	147	128	310	1934
% App. Total	24.3	68.8	6.8		40	31.9	28.1		31.4	53.6	15		11.3	47.4	41.3		
PHF	.804	.847	.885	.873	.868	.810	.814	.833	.831	.862	.519	.865	.795	.835	.696	.799	.967

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City of Murrieta
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E/W: Ivy Street/Los Alamos Road
Weather: Clear

File Name : 18_MUR_Jefferson_Ivy_Los Alamos AM
Site Code : 04218933
Start Date : 12/12/2018
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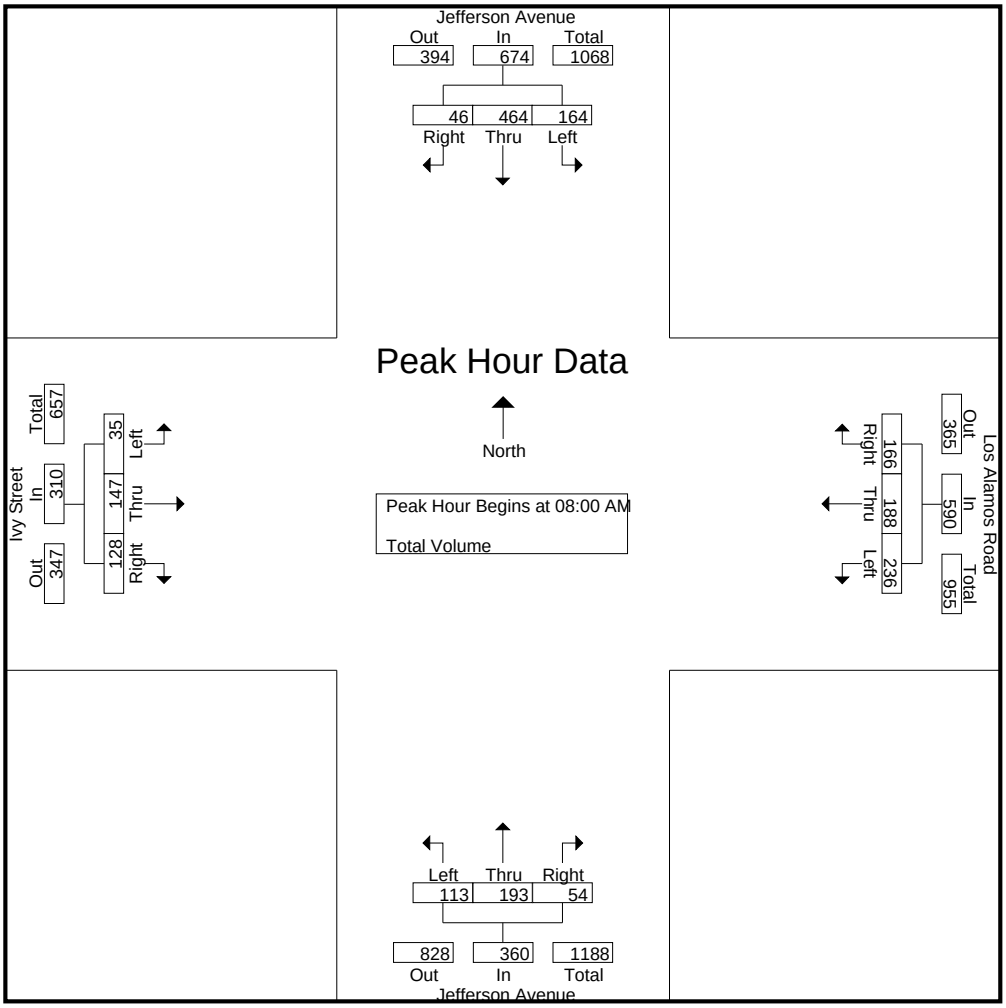

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	08:00 AM				07:30 AM				08:00 AM				07:45 AM			
+0 mins.	31	102	12	145	51	49	33	133	**34**	38	11	83	7	**44**	32	83
+15 mins.	39	105	9	153	**79**	55	45	**179**	23	**56**	10	89	7	37	20	64
+30 mins.	**51**	120	12	183	68	**58**	**51**	177	33	44	7	84	8	44	33	85
+45 mins.	43	**137**	**13**	**193**	55	51	40	146	23	55	**26**	**104**	**11**	40	**46**	**97**
Total Volume	164	464	46	674	253	213	169	635	113	193	54	360	33	165	131	329
% App. Total	24.3	68.8	6.8		39.8	33.5	26.6		31.4	53.6	15		10	50.2	39.8	
PHF	.804	.847	.885	.873	.801	.918	.828	.887	.831	.862	.519	.865	.750	.938	.712	.848

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City of Murrieta
N/S: Jefferson Avenue
E/W: Ivy Street/Los Alamos Road
Weather: Clear

File Name : 18_MUR_Jefferson_Ivy_Los Alamos PM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	Jefferson Avenue Southbound				Los Alamos Road Westbound				Jefferson Avenue Northbound				Ivy Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	40	86	11	137	32	47	35	114	37	148	91	276	16	86	22	124	651
04:15 PM	35	67	10	112	27	38	32	97	38	192	111	341	18	63	25	106	656
04:30 PM	32	59	7	98	24	45	39	108	35	211	96	342	17	82	44	143	691
04:45 PM	35	75	2	112	21	56	49	126	37	153	114	304	11	79	22	112	654
Total	142	287	30	459	104	186	155	445	147	704	412	1263	62	310	113	485	2652
05:00 PM	30	71	10	111	13	53	45	111	44	238	134	416	27	114	46	187	825
05:15 PM	26	74	10	110	30	41	41	112	43	290	124	457	21	72	35	128	807
05:30 PM	37	78	7	122	21	39	48	108	35	249	102	386	19	54	32	105	721
05:45 PM	39	82	5	126	12	38	35	85	41	243	96	380	11	74	25	110	701
Total	132	305	32	469	76	171	169	416	163	1020	456	1639	78	314	138	530	3054
Grand Total	274	592	62	928	180	357	324	861	310	1724	868	2902	140	624	251	1015	5706
Apprch %	29.5	63.8	6.7		20.9	41.5	37.6		10.7	59.4	29.9		13.8	61.5	24.7		
Total %	4.8	10.4	1.1	16.3	3.2	6.3	5.7	15.1	5.4	30.2	15.2	50.9	2.5	10.9	4.4	17.8	

	Jefferson Avenue Southbound				Los Alamos Road Westbound				Jefferson Avenue Northbound				Ivy Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	30	71	**10**	111	13	**53**	45	111	**44**	238	**134**	416	**27**	**114**	**46**	**187**	**825**
05:15 PM	26	74	10	110	**30**	41	41	**112**	43	**290**	124	**457**	21	72	35	128	807
05:30 PM	37	78	7	122	21	39	**48**	108	35	249	102	386	19	54	32	105	721
05:45 PM	**39**	**82**	5	**126**	12	38	35	85	41	243	96	380	11	74	25	110	701
Total Volume	132	305	32	469	76	171	169	416	163	1020	456	1639	78	314	138	530	3054
% App. Total	28.1	65	6.8		18.3	41.1	40.6		9.9	62.2	27.8		14.7	59.2	26		
PHF	.846	.930	.800	.931	.633	.807	.880	.929	.926	.879	.851	.897	.722	.689	.750	.709	.925

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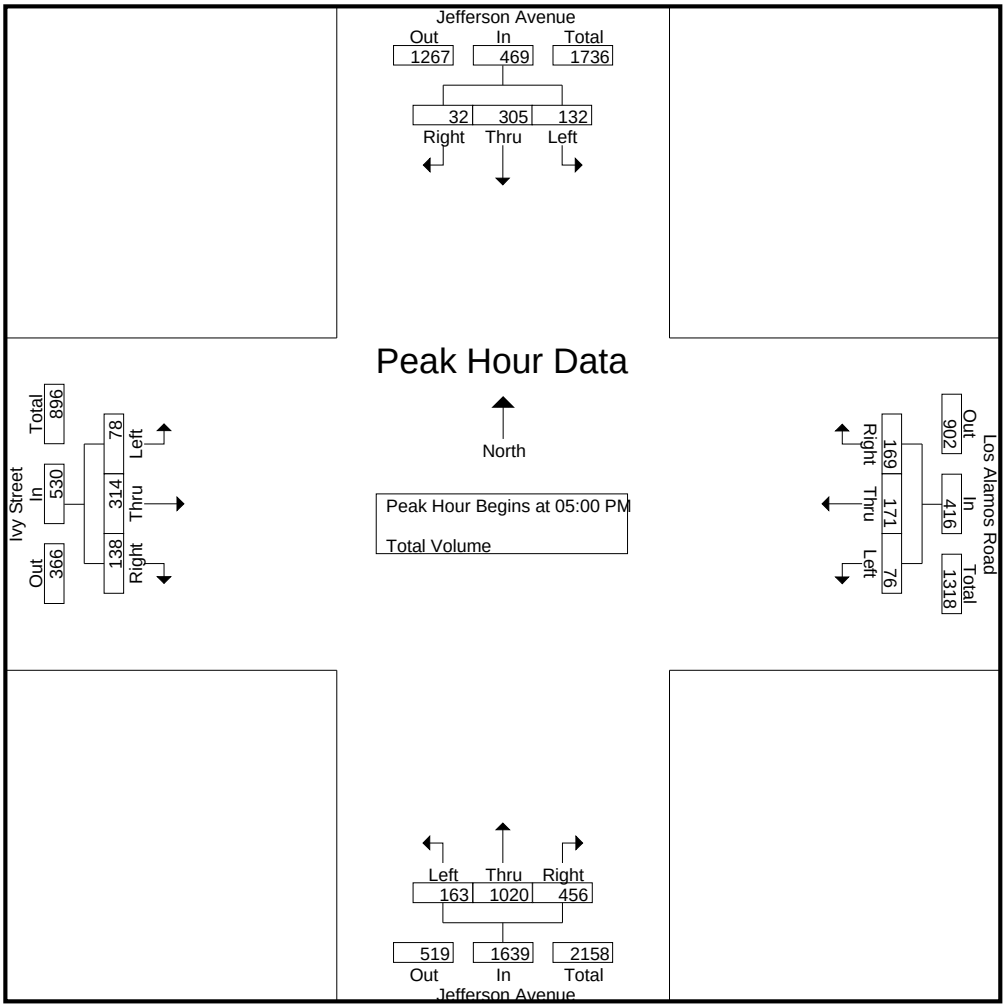
City of Murrieta
N/S: Jefferson Avenue
E/W: Ivy Street/Los Alamos Road
Weather: Clear

File Name : 18_MUR_Jefferson_Ivy_Los Alamos PM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	05:00 PM				04:30 PM				05:00 PM				04:30 PM			
+0 mins.	30	71	**10**	111	24	45	39	108	**44**	238	**134**	416	17	82	44	143
+15 mins.	26	74	10	110	21	**56**	**49**	**126**	43	**290**	124	**457**	11	79	22	112
+30 mins.	37	78	7	122	13	53	45	111	35	249	102	386	**27**	**114**	**46**	**187**
+45 mins.	**39**	**82**	5	**126**	**30**	41	41	112	41	243	96	380	21	72	35	128
Total Volume	132	305	32	469	88	195	174	457	163	1020	456	1639	76	347	147	570
% App. Total	28.1	65	6.8		19.3	42.7	38.1		9.9	62.2	27.8		13.3	60.9	25.8	
PHF	.846	.930	.800	.931	.733	.871	.888	.907	.926	.879	.851	.897	.704	.761	.799	.762

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City of Murrieta
N/S: Whitewood Road
E/W: Baxter Road
Weather: Clear

File Name : 19_MUR_Whitewood_Baxter AM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	Whitewood Road Southbound				Baxter Road Westbound				Whitewood Road Northbound				Baxter Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	1	166	51	218	0	0	1	1	3	84	0	87	9	1	7	17	323
07:15 AM	0	156	48	204	1	2	0	3	10	123	0	133	8	0	10	18	358
07:30 AM	0	177	31	208	2	2	0	4	6	127	1	134	12	2	8	22	368
07:45 AM	0	145	24	169	0	1	1	2	5	96	1	102	9	1	12	22	295
Total	1	644	154	799	3	5	2	10	24	430	2	456	38	4	37	79	1344
08:00 AM	0	163	31	194	0	1	0	1	8	92	0	100	9	0	9	18	313
08:15 AM	0	136	12	148	0	0	1	1	6	76	2	84	11	0	10	21	254
08:30 AM	2	121	13	136	1	0	1	2	10	95	0	105	9	0	14	23	266
08:45 AM	0	132	13	145	1	0	0	1	4	83	1	88	10	0	12	22	256
Total	2	552	69	623	2	1	2	5	28	346	3	377	39	0	45	84	1089
Grand Total	3	1196	223	1422	5	6	4	15	52	776	5	833	77	4	82	163	2433
Apprch %	0.2	84.1	15.7		33.3	40	26.7		6.2	93.2	0.6		47.2	2.5	50.3		
Total %	0.1	49.2	9.2	58.4	0.2	0.2	0.2	0.6	2.1	31.9	0.2	34.2	3.2	0.2	3.4	6.7	

	Whitewood Road Southbound				Baxter Road Westbound				Whitewood Road Northbound				Baxter Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	**1**	166	**51**	**218**	0	0	**1**	1	3	84	0	87	9	1	7	17	323
07:15 AM	0	156	48	204	1	**2**	0	3	**10**	123	0	133	8	0	10	18	358
07:30 AM	0	**177**	31	208	**2**	2	0	**4**	6	**127**	**1**	**134**	**12**	**2**	8	**22**	**368**
07:45 AM	0	145	24	169	0	1	1	2	5	96	1	102	9	1	**12**	22	295
Total Volume	1	644	154	799	3	5	2	10	24	430	2	456	38	4	37	79	1344
% App. Total	0.1	80.6	19.3		30	50	20		5.3	94.3	0.4		48.1	5.1	46.8		
PHF	.250	.910	.755	.916	.375	.625	.500	.625	.600	.846	.500	.851	.792	.500	.771	.898	.913

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City of Murrieta
N/S: Whitewood Road
E/W: Baxter Road
Weather: Clear

File Name : 19_MUR_Whitewood_Baxter AM
Site Code : 04218933
Start Date : 12/12/2018
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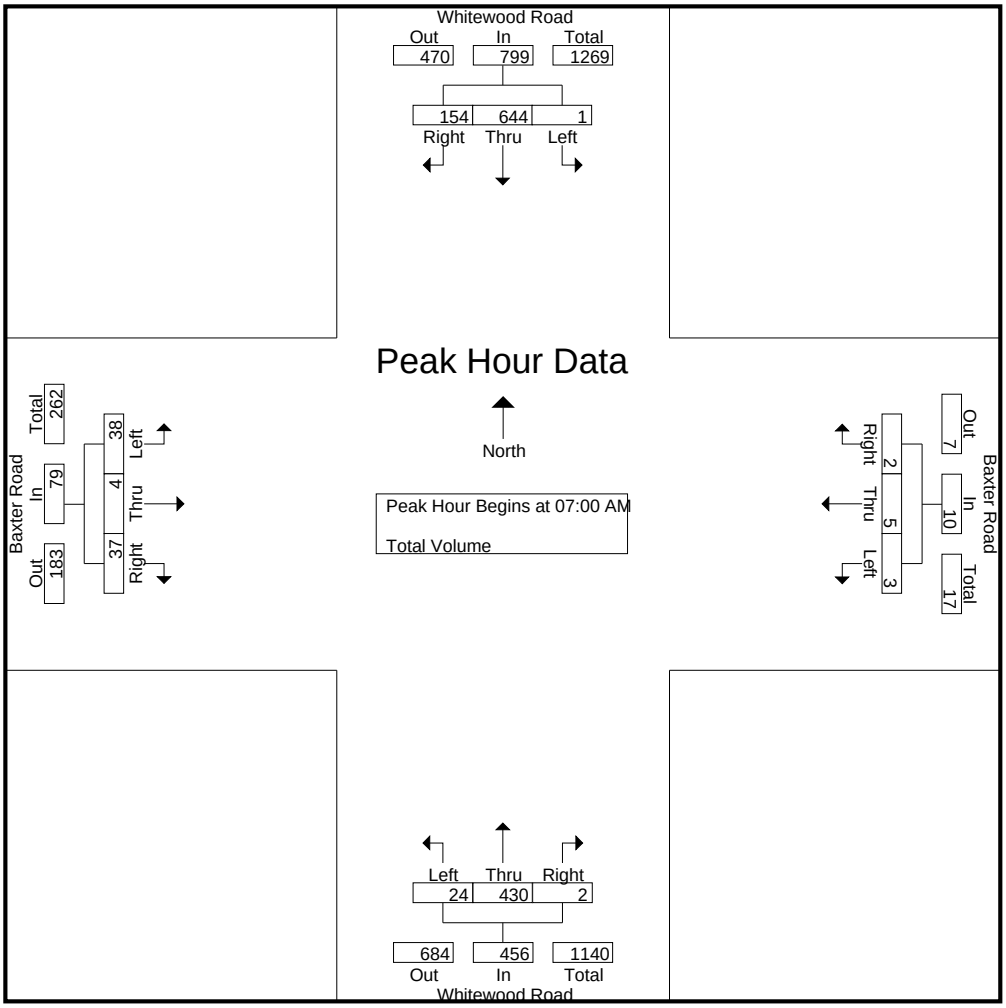

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM				07:00 AM				07:15 AM				07:45 AM			
+0 mins.	**1**	166	**51**	**218**	0	0	**1**	1	**10**	123	0	133	9	**1**	12	22
+15 mins.	0	156	48	204	1	**2**	0	3	6	**127**	**1**	**134**	9	0	9	18
+30 mins.	0	**177**	31	208	**2**	2	0	**4**	5	96	1	102	**11**	0	10	21
+45 mins.	0	145	24	169	0	1	1	2	8	92	0	100	9	0	**14**	**23**
Total Volume	1	644	154	799	3	5	2	10	29	438	2	469	38	1	45	84
% App. Total	0.1	80.6	19.3		30	50	20		6.2	93.4	0.4		45.2	1.2	53.6	
PHF	.250	.910	.755	.916	.375	.625	.500	.625	.725	.862	.500	.875	.864	.250	.804	.913

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City of Murrieta
N/S: Whitewood Road
E/W: Baxter Road
Weather: Clear

File Name : 19_MUR_Whitewood_Baxter PM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	Whitewood Road Southbound				Baxter Road Westbound				Whitewood Road Northbound				Baxter Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	1	119	13	133	0	1	0	1	17	185	0	202	15	0	24	39	375
04:15 PM	0	123	8	131	2	2	0	4	16	222	1	239	23	0	15	38	412
04:30 PM	1	140	10	151	0	0	2	2	12	241	0	253	32	0	20	52	458
04:45 PM	1	130	8	139	0	0	0	0	19	268	1	288	21	0	25	46	473
Total	3	512	39	554	2	3	2	7	64	916	2	982	91	0	84	175	1718
05:00 PM	3	132	18	153	0	0	1	1	23	242	1	266	25	0	19	44	464
05:15 PM	2	114	9	125	0	0	1	1	17	237	2	256	25	0	19	44	426
05:30 PM	0	119	8	127	0	0	1	1	12	242	0	254	22	1	8	31	413
05:45 PM	0	107	8	115	0	0	0	0	12	269	2	283	20	0	17	37	435
Total	5	472	43	520	0	0	3	3	64	990	5	1059	92	1	63	156	1738
Grand Total	8	984	82	1074	2	3	5	10	128	1906	7	2041	183	1	147	331	3456
Apprch %	0.7	91.6	7.6		20	30	50		6.3	93.4	0.3		55.3	0.3	44.4		
Total %	0.2	28.5	2.4	31.1	0.1	0.1	0.1	0.3	3.7	55.2	0.2	59.1	5.3	0	4.3	9.6	

	Whitewood Road Southbound				Baxter Road Westbound				Whitewood Road Northbound				Baxter Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	1	**140**	10	151	0	0	**2**	**2**	12	241	0	253	**32**	0	20	**52**	458
04:45 PM	1	130	8	139	0	0	0	0	19	**268**	1	**288**	21	0	**25**	46	**473**
05:00 PM	**3**	132	**18**	**153**	0	0	1	1	**23**	242	1	266	25	0	19	44	464
05:15 PM	2	114	9	125	0	0	1	1	17	237	**2**	256	25	0	19	44	426
Total Volume	7	516	45	568	0	0	4	4	71	988	4	1063	103	0	83	186	1821
% App. Total	1.2	90.8	7.9		0	0	100		6.7	92.9	0.4		55.4	0	44.6		
PHF	.583	.921	.625	.928	.000	.000	.500	.500	.772	.922	.500	.923	.805	.000	.830	.894	.962

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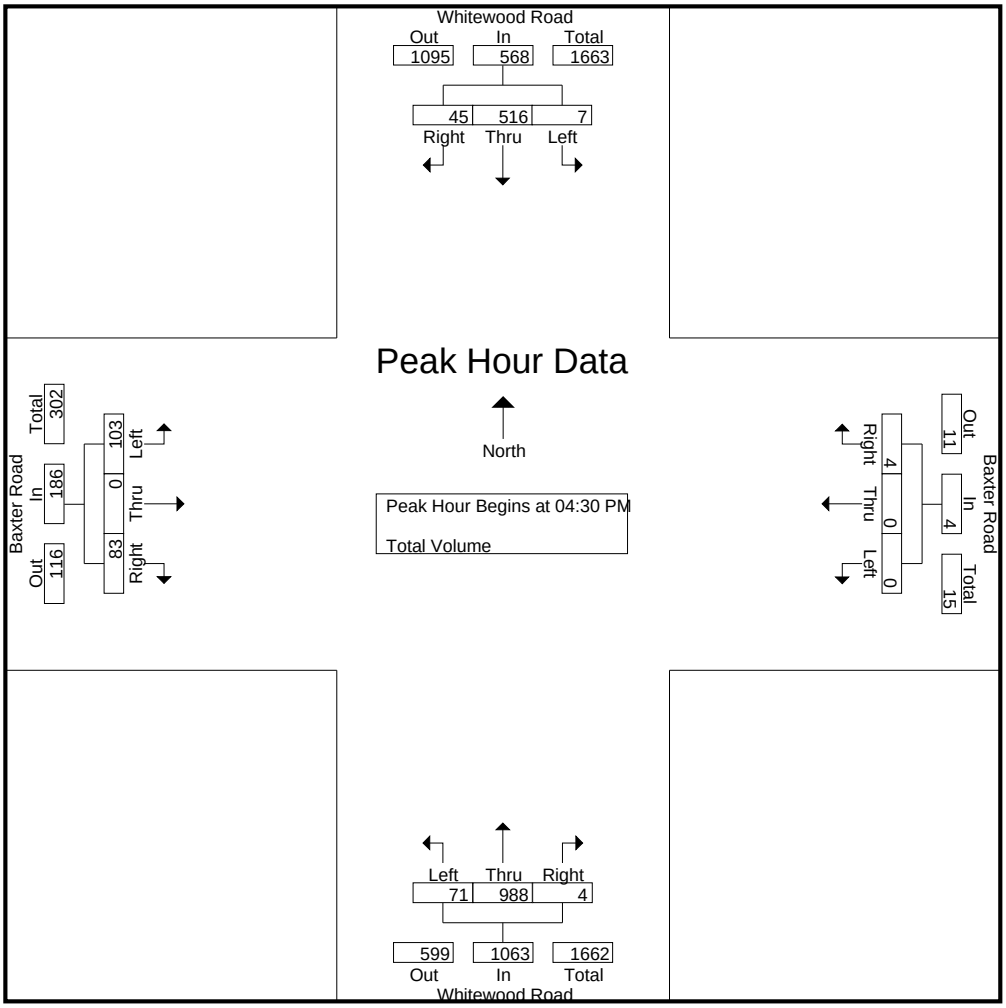
City of Murrieta
N/S: Whitewood Road
E/W: Baxter Road
Weather: Clear

File Name : 19_MUR_Whitewood_Baxter PM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:15 PM				04:00 PM				04:45 PM				04:30 PM			
+0 mins.	0	123	8	131	0	1	0	1	19	**268**	1	**288**	**32**	0	20	**52**
+15 mins.	1	**140**	10	151	**2**	**2**	0	**4**	**23**	242	1	266	21	0	**25**	46
+30 mins.	1	130	8	139	0	0	**2**	2	17	237	**2**	256	25	0	19	44
+45 mins.	**3**	132	**18**	**153**	0	0	0	0	12	242	0	254	25	0	19	44
Total Volume	5	525	44	574	2	3	2	7	71	989	4	1064	103	0	83	186
% App. Total	0.9	91.5	7.7		28.6	42.9	28.6		6.7	93	0.4		55.4	0	44.6	
PHF	.417	.938	.611	.938	.250	.375	.250	.438	.772	.923	.500	.924	.805	.000	.830	.894

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City of Murrieta
N/S: Whitewood Road
E/W: Linnel Lane/Lee Lane
Weather: Clear

File Name : 20_MUR_Whitewood_Linnel_Lee AM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	Whitewood Road Southbound				Lee Lane Westbound				Whitewood Road Northbound				Linnel Lane Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	2	174	3	179	14	2	1	17	20	59	4	83	5	3	16	24	303
07:15 AM	0	187	1	188	6	1	3	10	27	95	4	126	3	1	20	24	348
07:30 AM	3	188	8	199	8	0	2	10	33	87	3	123	4	2	23	29	361
07:45 AM	0	164	9	173	0	0	0	0	52	60	5	117	4	3	26	33	323
Total	5	713	21	739	28	3	6	37	132	301	16	449	16	9	85	110	1335
08:00 AM	0	137	5	142	9	2	1	12	29	57	4	90	5	1	28	34	278
08:15 AM	0	133	4	137	8	0	1	9	24	52	2	78	3	2	16	21	245
08:30 AM	0	122	9	131	7	2	0	9	28	69	3	100	0	0	19	19	259
08:45 AM	1	106	4	111	4	1	1	6	52	44	5	101	3	0	18	21	239
Total	1	498	22	521	28	5	3	36	133	222	14	369	11	3	81	95	1021
Grand Total	6	1211	43	1260	56	8	9	73	265	523	30	818	27	12	166	205	2356
Apprch %	0.5	96.1	3.4		76.7	11	12.3		32.4	63.9	3.7		13.2	5.9	81		
Total %	0.3	51.4	1.8	53.5	2.4	0.3	0.4	3.1	11.2	22.2	1.3	34.7	1.1	0.5	7	8.7	

	Whitewood Road Southbound				Lee Lane Westbound				Whitewood Road Northbound				Linnel Lane Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	2	174	3	179	**14**	**2**	1	**17**	20	59	4	83	**5**	**3**	16	24	303
07:15 AM	0	187	1	188	6	1	**3**	10	27	**95**	4	**126**	3	1	20	24	348
07:30 AM	**3**	**188**	8	**199**	8	0	2	10	33	87	3	123	4	2	23	29	**361**
07:45 AM	0	164	**9**	173	0	0	0	0	**52**	60	**5**	117	4	3	**26**	**33**	323
Total Volume	5	713	21	739	28	3	6	37	132	301	16	449	16	9	85	110	1335
% App. Total	0.7	96.5	2.8		75.7	8.1	16.2		29.4	67	3.6		14.5	8.2	77.3		
PHF	.417	.948	.583	.928	.500	.375	.500	.544	.635	.792	.800	.891	.800	.750	.817	.833	.925

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File Name : 20_MUR_Whitewood_Linnel_Lee AM
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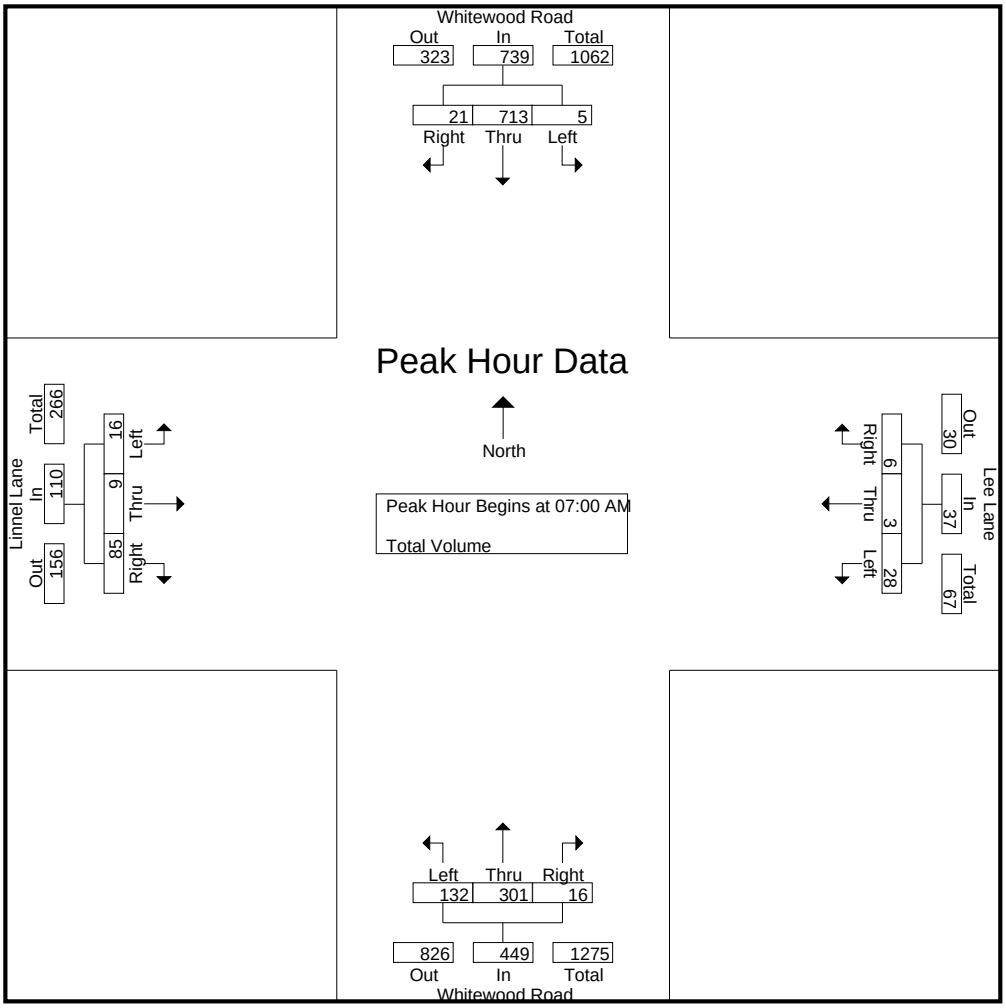

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM				07:00 AM				07:15 AM				07:15 AM			
+0 mins.	2	174	3	179	**14**	**2**	1	**17**	27	**95**	4	**126**	3	1	20	24
+15 mins.	0	187	1	188	6	1	**3**	10	33	87	3	123	4	2	23	29
+30 mins.	**3**	**188**	8	**199**	8	0	2	10	**52**	60	**5**	117	4	**3**	26	33
+45 mins.	0	164	**9**	173	0	0	0	0	29	57	4	90	**5**	1	**28**	**34**
Total Volume	5	713	21	739	28	3	6	37	141	299	16	456	16	7	97	120
% App. Total	0.7	96.5	2.8		75.7	8.1	16.2		30.9	65.6	3.5		13.3	5.8	80.8	
PHF	.417	.948	.583	.928	.500	.375	.500	.544	.678	.787	.800	.905	.800	.583	.866	.882

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E/W: Linnel Lane/Lee Lane
Weather: Clear

File Name : 20_MUR_Whitewood_Linnel_Lee PM
Site Code : 04218933
Start Date : 12/12/2018
Page No : 1

Groups Printed- Total Volume

	Whitewood Road Southbound				Lee Lane Westbound				Whitewood Road Northbound				Linnel Lane Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	77	4	81	6	0	2	8	43	181	4	228	5	2	43	50	367
04:15 PM	2	94	1	97	5	1	0	6	47	180	3	230	1	0	34	35	368
04:30 PM	1	103	3	107	4	0	2	6	50	222	5	277	5	2	47	54	444
04:45 PM	0	86	1	87	3	2	1	6	44	235	8	287	7	0	41	48	428
Total	3	360	9	372	18	3	5	26	184	818	20	1022	18	4	165	187	1607
05:00 PM	0	92	3	95	4	0	2	6	47	213	4	264	5	1	53	59	424
05:15 PM	0	90	1	91	4	1	1	6	44	223	3	270	4	1	30	35	402
05:30 PM	0	91	4	95	3	1	1	5	46	219	7	272	7	2	30	39	411
05:45 PM	0	81	6	87	1	0	0	1	52	222	5	279	1	3	27	31	398
Total	0	354	14	368	12	2	4	18	189	877	19	1085	17	7	140	164	1635
Grand Total	3	714	23	740	30	5	9	44	373	1695	39	2107	35	11	305	351	3242
Apprch %	0.4	96.5	3.1		68.2	11.4	20.5		17.7	80.4	1.9		10	3.1	86.9		
Total %	0.1	22	0.7	22.8	0.9	0.2	0.3	1.4	11.5	52.3	1.2	65	1.1	0.3	9.4	10.8	

	Whitewood Road Southbound				Lee Lane Westbound				Whitewood Road Northbound				Linnel Lane Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	**1**	**103**	**3**	**107**	**4**	0	**2**	**6**	**50**	222	5	277	5	**2**	47	54	**444**
04:45 PM	0	86	1	87	3	**2**	1	6	44	**235**	**8**	**287**	**7**	0	41	48	428
05:00 PM	0	92	3	95	4	0	2	6	47	213	4	264	5	1	**53**	**59**	424
05:15 PM	0	90	1	91	4	1	1	6	44	223	3	270	4	1	30	35	402
Total Volume	1	371	8	380	15	3	6	24	185	893	20	1098	21	4	171	196	1698
% App. Total	0.3	97.6	2.1		62.5	12.5	25		16.8	81.3	1.8		10.7	2	87.2		
PHF	.250	.900	.667	.888	.938	.375	.750	1.00	.925	.950	.625	.956	.750	.500	.807	.831	.956

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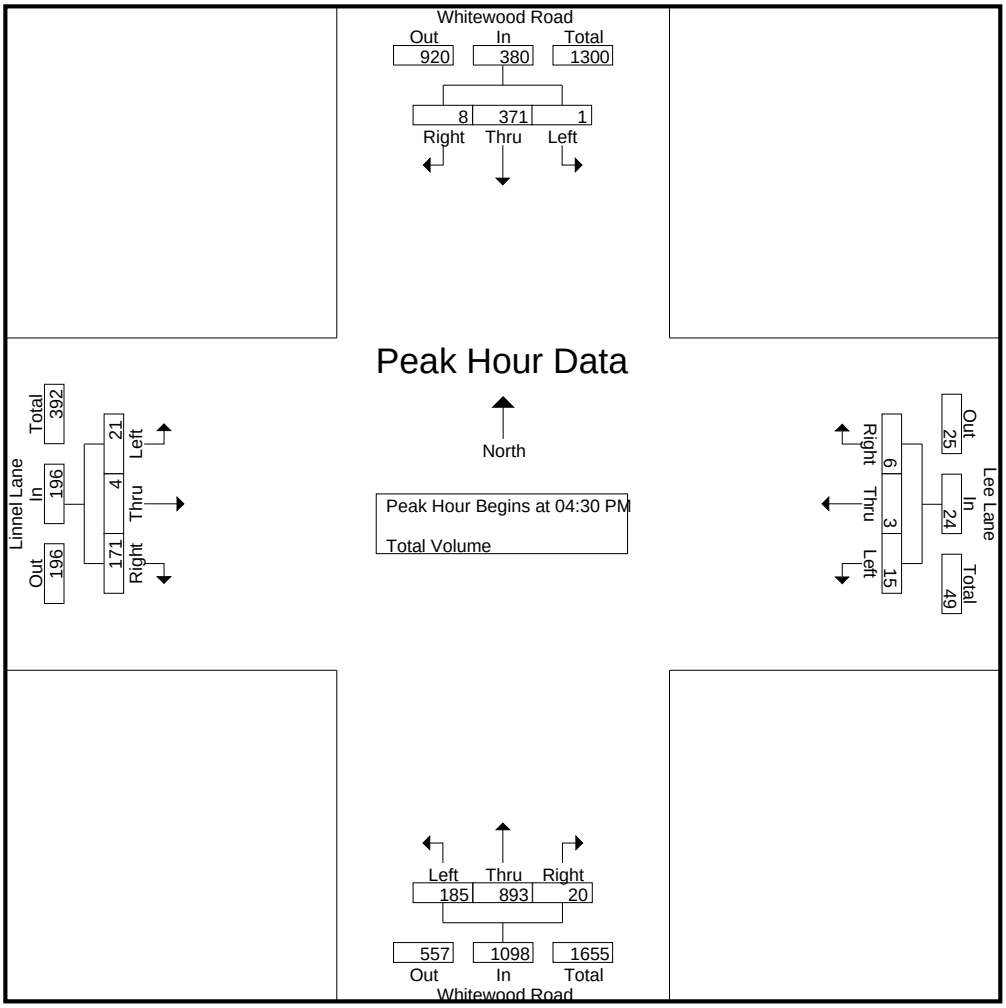


Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:15 PM				04:00 PM				04:30 PM				04:15 PM			
+0 mins.	**2**	94	1	97	**6**	0	**2**	**8**	**50**	222	5	277	1	0	34	35
+15 mins.	1	**103**	**3**	**107**	5	1	0	6	44	**235**	**8**	**287**	5	**2**	47	54
+30 mins.	0	86	1	87	4	0	2	6	47	213	4	264	**7**	0	41	48
+45 mins.	0	92	3	95	3	**2**	1	6	44	223	3	270	5	1	**53**	**59**
Total Volume	3	375	8	386	18	3	5	26	185	893	20	1098	18	3	175	196
% App. Total	0.8	97.2	2.1		69.2	11.5	19.2		16.8	81.3	1.8		9.2	1.5	89.3	
PHF	.375	.910	.667	.902	.750	.375	.625	.813	.925	.950	.625	.956	.643	.375	.825	.831

APPENDIX B – LOS CALCULATION SHEETS

EXISTING CONDITIONS

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	593	233	150	231	220	539
Future Volume (vph)	593	233	150	231	220	539
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.97	1.00	0.91	1.00	0.97	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	1583	5085	1583	3433	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	1583	5085	1583	3433	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	645	253	163	251	239	586
RTOR Reduction (vph)	0	186	0	142	0	0
Lane Group Flow (vph)	645	67	163	109	239	586
Turn Type	Perm	Perm	NA	Perm	Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2		
Actuated Green, G (s)	21.0	21.0	34.6	34.6	10.6	49.7
Effective Green, g (s)	21.0	21.0	34.6	34.6	10.6	49.7
Actuated g/C Ratio	0.26	0.26	0.43	0.43	0.13	0.62
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	904	417	2207	687	456	2206
v/s Ratio Prot			0.03		c0.07	c0.17
v/s Ratio Perm	c0.19	0.04		0.07		
v/c Ratio	0.71	0.16	0.07	0.16	0.52	0.27
Uniform Delay, d1	26.6	22.6	13.2	13.7	32.2	6.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.7	0.2	0.1	0.5	1.1	0.3
Delay (s)	29.3	22.7	13.2	14.2	33.3	7.1
Level of Service	C	C	B	B	C	A
Approach Delay (s)	27.5		13.8			14.7
Approach LOS	C		B			B

Intersection Summary			
HCM 2000 Control Delay	19.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	79.7	Sum of lost time (s)	13.5
Intersection Capacity Utilization	39.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	343	59	417	615	224	20	78	207	278	173	89
Future Volume (veh/h)	70	343	59	417	615	224	20	78	207	278	173	89
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	79	385	66	469	691	252	22	88	233	312	194	100
Adj No. of Lanes	2	4	0	2	3	1	2	1	2	2	2	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	147	962	158	534	1446	450	80	734	1248	373	1102	545
Arrive On Green	0.04	0.17	0.17	0.16	0.28	0.28	0.02	0.39	0.39	0.11	0.48	0.48
Sat Flow, veh/h	3442	5591	916	3442	5085	1583	3548	1863	3167	3442	2296	1136
Grp Volume(v), veh/h	79	328	123	469	691	252	22	88	233	312	148	146
Grp Sat Flow(s),veh/h/ln	1721	1602	1701	1721	1695	1583	1774	1863	1583	1721	1770	1662
Q Serve(g_s), s	2.4	6.4	6.8	14.1	11.9	14.3	0.6	3.2	5.1	9.4	5.0	5.3
Cycle Q Clear(g_c), s	2.4	6.4	6.8	14.1	11.9	14.3	0.6	3.2	5.1	9.4	5.0	5.3
Prop In Lane	1.00		0.54	1.00		1.00	1.00		1.00	1.00		0.68
Lane Grp Cap(c), veh/h	147	827	293	534	1446	450	80	734	1248	373	849	798
V/C Ratio(X)	0.54	0.40	0.42	0.88	0.48	0.56	0.28	0.12	0.19	0.84	0.17	0.18
Avail Cap(c_a), veh/h	215	1411	499	570	2018	628	168	734	1248	388	849	798
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.5	38.8	39.0	43.6	31.3	32.1	50.8	20.4	20.9	46.2	15.6	15.7
Incr Delay (d2), s/veh	3.0	0.3	1.0	14.0	0.2	1.1	1.8	0.3	0.3	14.3	0.4	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	2.9	3.3	7.8	5.6	6.4	0.3	1.7	2.3	5.2	2.5	2.6
LnGrp Delay(d),s/veh	52.6	39.2	40.0	57.7	31.5	33.2	52.6	20.7	21.3	60.4	16.0	16.2
LnGrp LOS	D	D	D	E	C	C	D	C	C	E	B	B
Approach Vol, veh/h		530			1412			343			606	
Approach Delay, s/veh		41.3			40.5			23.1			38.9	
Approach LOS		D			D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.9	46.1	20.9	22.7	6.9	55.2	9.0	34.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	11.9	41.6	17.5	31.0	5.0	48.5	6.6	41.9
Max Q Clear Time (g_c+I1), s	11.4	7.1	16.1	8.8	2.6	7.3	4.4	16.3
Green Ext Time (p_c), s	0.1	3.5	0.3	9.4	0.0	3.5	0.0	10.0

Intersection Summary	
HCM 2010 Ctrl Delay	38.3
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	71	418	69	100	513	162	76	188	118	133	313	87
Future Volume (veh/h)	71	418	69	100	513	162	76	188	118	133	313	87
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	72	422	70	101	518	164	77	190	119	134	316	88
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	93	801	132	129	752	237	99	652	554	170	547	152
Arrive On Green	0.05	0.26	0.26	0.07	0.28	0.28	0.06	0.35	0.35	0.10	0.39	0.39
Sat Flow, veh/h	1774	3043	501	1774	2650	835	1774	1863	1583	1774	1403	391
Grp Volume(v), veh/h	72	244	248	101	345	337	77	190	119	134	0	404
Grp Sat Flow(s),veh/h/ln	1774	1770	1774	1774	1770	1715	1774	1863	1583	1774	0	1794
Q Serve(g_s), s	3.3	9.7	9.8	4.6	14.3	14.4	3.5	6.1	4.4	6.1	0.0	14.6
Cycle Q Clear(g_c), s	3.3	9.7	9.8	4.6	14.3	14.4	3.5	6.1	4.4	6.1	0.0	14.6
Prop In Lane	1.00		0.28	1.00		0.49	1.00		1.00	1.00		0.22
Lane Grp Cap(c), veh/h	93	466	467	129	502	487	99	652	554	170	0	699
V/C Ratio(X)	0.77	0.52	0.53	0.78	0.69	0.69	0.78	0.29	0.21	0.79	0.00	0.58
Avail Cap(c_a), veh/h	207	732	734	190	715	693	151	652	554	325	0	699
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	38.6	25.9	26.0	37.6	26.3	26.3	38.4	19.4	18.8	36.4	0.0	19.8
Incr Delay (d2), s/veh	12.8	0.9	0.9	12.0	1.7	1.8	13.1	1.1	0.9	8.0	0.0	3.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	4.9	4.9	2.7	7.2	7.1	2.1	3.3	2.0	3.4	0.0	7.9
LnGrp Delay(d),s/veh	51.3	26.8	26.9	49.5	27.9	28.1	51.5	20.5	19.7	44.4	0.0	23.3
LnGrp LOS	D	C	C	D	C	C	D	C	B	D		C
Approach Vol, veh/h		564			783			386			538	
Approach Delay, s/veh		30.0			30.8			26.5			28.5	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.4	33.3	10.5	26.2	9.1	36.6	8.8	27.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	15.1	24.0	8.8	34.1	7.0	32.1	9.6	33.3
Max Q Clear Time (g_c+I1), s	8.1	8.1	6.6	11.8	5.5	16.6	5.3	16.4
Green Ext Time (p_c), s	0.2	3.8	0.0	7.9	0.0	3.7	0.0	6.9

Intersection Summary	
HCM 2010 Ctrl Delay	29.3
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	152	93	94	1	71	171	88	612	1	240	1075	151
Future Volume (veh/h)	152	93	94	1	71	171	88	612	1	240	1075	151
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	165	101	102	1	77	186	96	665	1	261	1168	164
Adj No. of Lanes	1	1	1	1	1	1	1	3	1	1	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	200	490	417	2	282	240	123	1961	610	298	2462	767
Arrive On Green	0.11	0.26	0.26	0.00	0.15	0.15	0.07	0.39	0.39	0.17	0.48	0.48
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	1774	5085	1583	1774	5085	1583
Grp Volume(v), veh/h	165	101	102	1	77	186	96	665	1	261	1168	164
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1695	1583	1774	1695	1583
Q Serve(g_s), s	9.0	4.2	5.0	0.1	3.6	11.2	5.3	9.1	0.0	14.2	15.2	5.9
Cycle Q Clear(g_c), s	9.0	4.2	5.0	0.1	3.6	11.2	5.3	9.1	0.0	14.2	15.2	5.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	200	490	417	2	282	240	123	1961	610	298	2462	767
V/C Ratio(X)	0.82	0.21	0.24	0.41	0.27	0.78	0.78	0.34	0.00	0.88	0.47	0.21
Avail Cap(c_a), veh/h	375	875	743	90	575	489	244	1961	610	404	2462	767
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.9	28.4	28.7	49.3	37.1	40.3	45.3	21.5	18.7	40.1	17.1	14.7
Incr Delay (d2), s/veh	8.2	0.2	0.3	84.7	0.5	5.3	10.3	0.5	0.0	15.1	0.7	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.9	2.2	2.2	0.1	1.9	5.3	2.9	4.3	0.0	8.2	7.2	2.7
LnGrp Delay(d),s/veh	51.1	28.6	29.0	134.0	37.6	45.6	55.6	21.9	18.7	55.2	17.7	15.3
LnGrp LOS	D	C	C	F	D	D	E	C	B	E	B	B
Approach Vol, veh/h		368			264			762			1593	
Approach Delay, s/veh		38.8			43.6			26.2			23.6	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.1	42.6	4.6	30.5	11.3	52.3	15.7	19.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	22.5	38.1	5.0	46.4	13.6	47.0	20.9	30.5
Max Q Clear Time (g_c+I1), s	16.2	11.1	2.1	7.0	7.3	17.2	11.0	13.2
Green Ext Time (p_c), s	0.4	16.5	0.0	2.1	0.1	17.5	0.3	1.8

Intersection Summary	
HCM 2010 Ctrl Delay	27.9
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	95	47	67	131	48	21	98	41	39	276	13
Future Volume (veh/h)	5	95	47	67	131	48	21	98	41	39	276	13
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	5	101	50	71	139	51	22	104	44	41	294	14
Adj No. of Lanes	1	1	0	1	1	1	1	1	1	1	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	12	160	79	96	341	290	44	943	802	70	919	44
Arrive On Green	0.01	0.14	0.14	0.05	0.18	0.18	0.02	0.51	0.51	0.04	0.52	0.52
Sat Flow, veh/h	1774	1177	583	1774	1863	1583	1774	1863	1583	1774	1764	84
Grp Volume(v), veh/h	5	0	151	71	139	51	22	104	44	41	0	308
Grp Sat Flow(s),veh/h/ln	1774	0	1760	1774	1863	1583	1774	1863	1583	1774	0	1848
Q Serve(g_s), s	0.2	0.0	5.5	2.7	4.5	1.9	0.8	2.0	1.0	1.5	0.0	6.5
Cycle Q Clear(g_c), s	0.2	0.0	5.5	2.7	4.5	1.9	0.8	2.0	1.0	1.5	0.0	6.5
Prop In Lane	1.00		0.33	1.00		1.00	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	12	0	239	96	341	290	44	943	802	70	0	963
V/C Ratio(X)	0.43	0.00	0.63	0.74	0.41	0.18	0.50	0.11	0.05	0.58	0.00	0.32
Avail Cap(c_a), veh/h	143	0	684	325	916	778	195	943	802	221	0	963
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	33.7	0.0	27.8	31.7	24.6	23.5	32.8	8.8	8.5	32.2	0.0	9.4
Incr Delay (d2), s/veh	22.5	0.0	2.8	10.4	0.8	0.3	8.3	0.2	0.1	7.5	0.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	2.9	1.6	2.4	0.8	0.5	1.1	0.4	0.9	0.0	3.6
LnGrp Delay(d),s/veh	56.2	0.0	30.6	42.2	25.3	23.8	41.1	9.0	8.7	39.6	0.0	10.3
LnGrp LOS	E		C	D	C	C	D	A	A	D		B
Approach Vol, veh/h		156			261			170			349	
Approach Delay, s/veh		31.4			29.6			13.1			13.7	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.2	39.0	8.2	13.7	6.2	40.0	5.0	17.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	8.5	34.5	12.5	26.5	7.5	35.5	5.5	33.5
Max Q Clear Time (g_c+I1), s	3.5	4.0	4.7	7.5	2.8	8.5	2.2	6.5
Green Ext Time (p_c), s	0.0	2.8	0.1	1.7	0.0	2.7	0.0	1.9

Intersection Summary	
HCM 2010 Ctrl Delay	21.0
HCM 2010 LOS	C

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	23	79	81	65	174	231
Future Volume (veh/h)	23	79	81	65	174	231
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	27	92	94	76	202	269
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	139	124	1163	988	246	1520
Arrive On Green	0.08	0.08	0.62	0.62	0.14	0.82
Sat Flow, veh/h	1774	1583	1863	1583	1774	1863
Grp Volume(v), veh/h	27	92	94	76	202	269
Grp Sat Flow(s),veh/h/ln	1774	1583	1863	1583	1774	1863
Q Serve(g_s), s	1.2	4.8	1.7	1.6	9.4	2.6
Cycle Q Clear(g_c), s	1.2	4.8	1.7	1.6	9.4	2.6
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	139	124	1163	988	246	1520
V/C Ratio(X)	0.19	0.74	0.08	0.08	0.82	0.18
Avail Cap(c_a), veh/h	448	400	1163	988	614	1520
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.7	38.4	6.3	6.3	35.6	1.7
Incr Delay (d2), s/veh	0.7	8.4	0.1	0.2	6.6	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	2.4	0.9	0.7	5.1	1.5
LnGrp Delay(d),s/veh	37.4	46.8	6.5	6.5	42.3	1.9
LnGrp LOS	D	D	A	A	D	A
Approach Vol, veh/h	119		170			471
Approach Delay, s/veh	44.7		6.5			19.2
Approach LOS	D		A			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	16.3	57.7				74.0		11.2
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	29.5	35.5				69.5		21.5
Max Q Clear Time (g_c+I1), s	11.4	3.7				4.6		6.8
Green Ext Time (p_c), s	0.5	2.5				2.6		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	20.4
HCM 2010 LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	900	134	571	855	131	431
Future Volume (vph)	900	134	571	855	131	431
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5	4.5	4.5	4.5
Lane Util. Factor	0.95		1.00	0.95	0.97	0.91
Frt	0.98		1.00	1.00	0.91	0.85
Flt Protected	1.00		0.95	1.00	0.98	1.00
Satd. Flow (prot)	3470		1770	3539	3216	1441
Flt Permitted	1.00		0.95	1.00	0.98	1.00
Satd. Flow (perm)	3470		1770	3539	3216	1441
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	947	141	601	900	138	454
RTOR Reduction (vph)	10	0	0	0	164	164
Lane Group Flow (vph)	1078	0	601	900	201	63
Turn Type	NA		Prot	NA	Perm	Perm
Protected Phases	4		3	8		
Permitted Phases					2	2
Actuated Green, G (s)	34.5		38.5	77.5	33.5	33.5
Effective Green, g (s)	34.5		38.5	77.5	33.5	33.5
Actuated g/C Ratio	0.29		0.32	0.65	0.28	0.28
Clearance Time (s)	4.5		4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	997		567	2285	897	402
v/s Ratio Prot	c0.31		c0.34	0.25		
v/s Ratio Perm					c0.06	0.04
v/c Ratio	1.08		1.06	0.39	0.22	0.16
Uniform Delay, d1	42.8		40.8	10.1	33.3	32.6
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	53.1		54.7	0.1	0.6	0.8
Delay (s)	95.9		95.4	10.2	33.8	33.4
Level of Service	F		F	B	C	C
Approach Delay (s)	95.9			44.3	33.7	
Approach LOS	F			D	C	

Intersection Summary			
HCM 2000 Control Delay	60.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	688	257	201	571	186	139	122	106	192	275	46
Future Volume (veh/h)	26	688	257	201	571	186	139	122	106	192	275	46
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	29	756	282	221	627	204	153	134	116	211	302	51
Adj No. of Lanes	1	2	1	1	1	1	1	1	1	1	2	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	47	1046	468	225	738	627	177	556	472	216	972	162
Arrive On Green	0.03	0.30	0.30	0.13	0.40	0.40	0.10	0.30	0.30	0.12	0.32	0.32
Sat Flow, veh/h	1774	3539	1583	1774	1863	1583	1774	1863	1583	1774	3036	507
Grp Volume(v), veh/h	29	756	282	221	627	204	153	134	116	211	175	178
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1863	1583	1774	1863	1583	1774	1770	1773
Q Serve(g_s), s	1.8	21.9	17.4	14.2	35.0	10.2	9.7	6.2	6.3	13.5	8.5	8.7
Cycle Q Clear(g_c), s	1.8	21.9	17.4	14.2	35.0	10.2	9.7	6.2	6.3	13.5	8.5	8.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.29
Lane Grp Cap(c), veh/h	47	1046	468	225	738	627	177	556	472	216	567	568
V/C Ratio(X)	0.62	0.72	0.60	0.98	0.85	0.33	0.86	0.24	0.25	0.98	0.31	0.31
Avail Cap(c_a), veh/h	78	1223	547	225	799	679	177	556	472	216	567	568
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.1	36.1	34.5	49.8	31.4	23.9	50.7	30.3	30.3	50.0	29.3	29.4
Incr Delay (d2), s/veh	12.7	1.8	1.4	54.6	8.2	0.3	33.1	1.0	1.2	54.7	1.4	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	11.0	7.8	10.4	19.6	4.5	6.4	3.4	2.9	9.9	4.4	4.5
LnGrp Delay(d),s/veh	67.8	37.8	35.9	104.4	39.6	24.2	83.8	31.3	31.6	104.8	30.7	30.8
LnGrp LOS	E	D	D	F	D	C	F	C	C	F	C	C
Approach Vol, veh/h		1067			1052			403			564	
Approach Delay, s/veh		38.1			50.2			51.3			58.4	
Approach LOS		D			D			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.4	38.6	19.0	38.3	15.9	41.1	7.5	49.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	13.9	34.1	14.5	39.5	11.4	36.6	5.0	49.0
Max Q Clear Time (g_c+I1), s	15.5	8.3	16.2	23.9	11.7	10.7	3.8	37.0
Green Ext Time (p_c), s	0.0	3.4	0.0	9.9	0.0	3.4	0.0	8.2

Intersection Summary	
HCM 2010 Ctrl Delay	47.7
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	477	497	112	268	521	94	120	677	133	172	1507	541
Future Volume (veh/h)	477	497	112	268	521	94	120	677	133	172	1507	541
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	492	512	115	276	537	97	124	698	137	177	1554	558
Adj No. of Lanes	2	3	1	2	2	1	2	3	1	2	3	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	420	1339	417	352	862	386	168	2058	641	185	2083	648
Arrive On Green	0.12	0.26	0.26	0.10	0.24	0.24	0.05	0.40	0.40	0.05	0.41	0.41
Sat Flow, veh/h	3442	5085	1583	3442	3539	1583	3442	5085	1583	3442	5085	1583
Grp Volume(v), veh/h	492	512	115	276	537	97	124	698	137	177	1554	558
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1770	1583	1721	1695	1583	1721	1695	1583
Q Serve(g_s), s	12.5	8.4	5.9	8.0	13.8	5.1	3.6	9.7	5.8	5.2	26.6	32.9
Cycle Q Clear(g_c), s	12.5	8.4	5.9	8.0	13.8	5.1	3.6	9.7	5.8	5.2	26.6	32.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	420	1339	417	352	862	386	168	2058	641	185	2083	648
V/C Ratio(X)	1.17	0.38	0.28	0.78	0.62	0.25	0.74	0.34	0.21	0.96	0.75	0.86
Avail Cap(c_a), veh/h	420	1958	610	528	1474	659	168	2058	641	185	2083	648
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.9	30.9	29.9	44.8	34.5	31.2	48.0	21.0	19.9	48.3	25.7	27.5
Incr Delay (d2), s/veh	99.3	0.2	0.4	4.5	0.7	0.3	15.6	0.4	0.8	53.5	2.5	14.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.7	4.0	2.6	4.0	6.9	2.2	2.1	4.6	2.6	3.9	12.9	16.8
LnGrp Delay(d),s/veh	144.2	31.0	30.3	49.3	35.3	31.5	63.6	21.5	20.6	101.8	28.2	41.6
LnGrp LOS	F	C	C	D	D	C	E	C	C	F	C	D
Approach Vol, veh/h		1119			910			959			2289	
Approach Delay, s/veh		80.7			39.1			26.8			37.1	
Approach LOS		F			D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	45.9	15.0	31.4	9.5	46.4	17.0	29.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	41.4	15.7	39.4	5.0	41.9	12.5	42.6
Max Q Clear Time (g_c+I1), s	7.2	11.7	10.0	10.4	5.6	34.9	14.5	15.8
Green Ext Time (p_c), s	0.0	23.9	0.5	9.3	0.0	6.5	0.0	9.1

Intersection Summary	
HCM 2010 Ctrl Delay	44.8
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	117	746	74	238	939	195	86	103	88	461	216	188
Future Volume (veh/h)	117	746	74	238	939	195	86	103	88	461	216	188
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	127	811	80	259	1021	212	93	112	96	501	235	204
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	2	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	150	975	96	283	1094	227	115	473	372	548	318	276
Arrive On Green	0.08	0.30	0.30	0.16	0.37	0.37	0.06	0.25	0.25	0.16	0.35	0.35
Sat Flow, veh/h	1774	3255	321	1774	2921	605	1774	1886	1485	3442	922	800
Grp Volume(v), veh/h	127	441	450	259	618	615	93	104	104	501	0	439
Grp Sat Flow(s),veh/h/ln	1774	1770	1806	1774	1770	1756	1774	1770	1601	1721	0	1722
Q Serve(g_s), s	9.7	32.0	32.0	19.8	46.1	46.4	7.1	6.5	7.1	19.7	0.0	30.8
Cycle Q Clear(g_c), s	9.7	32.0	32.0	19.8	46.1	46.4	7.1	6.5	7.1	19.7	0.0	30.8
Prop In Lane	1.00		0.18	1.00		0.34	1.00		0.93	1.00		0.46
Lane Grp Cap(c), veh/h	150	530	541	283	663	658	115	444	401	548	0	595
V/C Ratio(X)	0.85	0.83	0.83	0.91	0.93	0.94	0.81	0.24	0.26	0.91	0.00	0.74
Avail Cap(c_a), veh/h	161	530	541	316	675	670	143	444	401	563	0	595
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	62.1	45.0	45.0	56.9	41.3	41.4	63.5	41.0	41.3	56.9	0.0	39.6
Incr Delay (d2), s/veh	30.5	10.8	10.7	28.1	19.6	20.4	23.8	1.2	1.6	19.4	0.0	8.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.0	17.3	17.6	11.9	26.1	26.3	4.2	3.3	3.3	10.9	0.0	16.0
LnGrp Delay(d),s/veh	92.6	55.8	55.6	85.0	60.9	61.8	87.3	42.3	42.8	76.3	0.0	47.6
LnGrp LOS	F	E	E	F	E	E	F	D	D	E		D
Approach Vol, veh/h		1018			1492			301			940	
Approach Delay, s/veh		60.3			65.4			56.4			62.9	
Approach LOS		E			E			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	26.4	39.0	26.5	45.7	13.4	52.0	16.1	56.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	22.5	34.5	24.5	40.5	11.1	45.9	12.5	52.5
Max Q Clear Time (g_c+I1), s	21.7	9.1	21.8	34.0	9.1	32.8	11.7	48.4
Green Ext Time (p_c), s	0.2	4.5	0.2	5.5	0.0	3.5	0.0	3.1

Intersection Summary	
HCM 2010 Ctrl Delay	62.7
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	967	359	223	917	0	0	0	0	146	3	733
Future Volume (vph)	0	967	359	223	917	0	0	0	0	146	3	733
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5		4.5	4.5					4.5	4.5	4.5
Lane Util. Factor		0.91		0.97	0.95					0.95	0.91	0.95
Frt		0.96		1.00	1.00					1.00	0.86	0.85
Flt Protected		1.00		0.95	1.00					0.95	1.00	1.00
Satd. Flow (prot)		4879		3433	3539					1681	1450	1504
Flt Permitted		1.00		0.95	1.00					0.95	1.00	1.00
Satd. Flow (perm)		4879		3433	3539					1681	1450	1504
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	997	370	230	945	0	0	0	0	151	3	756
RTOR Reduction (vph)	0	68	0	0	0	0	0	0	0	0	62	62
Lane Group Flow (vph)	0	1299	0	230	945	0	0	0	0	136	326	324
Turn Type		NA		Prot	NA					Prot	NA	Perm
Protected Phases		4		3	8					1	6	
Permitted Phases												6
Actuated Green, G (s)		33.8		10.9	49.2					38.0	38.0	38.0
Effective Green, g (s)		33.8		10.9	49.2					38.0	38.0	38.0
Actuated g/C Ratio		0.35		0.11	0.51					0.40	0.40	0.40
Clearance Time (s)		4.5		4.5	4.5					4.5	4.5	4.5
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	3.0
Lane Grp Cap (vph)		1714		388	1809					664	572	594
v/s Ratio Prot		c0.27		0.07	c0.27					0.08	c0.22	
v/s Ratio Perm												0.22
v/c Ratio		0.76		0.59	0.52					0.20	0.57	0.54
Uniform Delay, d1		27.6		40.5	15.7					19.2	22.7	22.4
Progression Factor		1.00		1.00	1.00					1.00	1.00	1.00
Incremental Delay, d2		2.0		2.4	0.3					0.2	1.3	3.6
Delay (s)		29.6		43.0	15.9					19.3	24.0	26.0
Level of Service		C		D	B					B	C	C
Approach Delay (s)		29.6			21.2			0.0			24.2	
Approach LOS		C			C			A			C	

Intersection Summary			
HCM 2000 Control Delay	25.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	96.2	Sum of lost time (s)	13.5
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	1248	10	23	1584	247	35	62	45	421	48	141
Future Volume (veh/h)	28	1248	10	23	1584	247	35	62	45	421	48	141
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	30	1328	11	24	1685	263	37	66	48	448	51	150
Adj No. of Lanes	1	3	0	1	3	0	1	1	0	2	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	47	1993	17	41	1686	262	53	303	220	481	767	652
Arrive On Green	0.03	0.38	0.38	0.02	0.38	0.38	0.03	0.30	0.30	0.14	0.41	0.41
Sat Flow, veh/h	1774	5202	43	1774	4442	689	1774	1004	730	3442	1863	1583
Grp Volume(v), veh/h	30	865	474	24	1284	664	37	0	114	448	51	150
Grp Sat Flow(s),veh/h/ln	1774	1695	1855	1774	1695	1741	1774	0	1734	1721	1863	1583
Q Serve(g_s), s	2.0	25.0	25.0	1.6	44.6	44.8	2.4	0.0	5.8	15.2	2.0	7.3
Cycle Q Clear(g_c), s	2.0	25.0	25.0	1.6	44.6	44.8	2.4	0.0	5.8	15.2	2.0	7.3
Prop In Lane	1.00		0.02	1.00		0.40	1.00		0.42	1.00		1.00
Lane Grp Cap(c), veh/h	47	1298	711	41	1287	661	53	0	523	481	767	652
V/C Ratio(X)	0.64	0.67	0.67	0.59	1.00	1.01	0.70	0.00	0.22	0.93	0.07	0.23
Avail Cap(c_a), veh/h	77	1298	711	89	1287	661	104	0	523	481	767	652
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.9	30.2	30.2	57.1	36.6	36.6	56.7	0.0	30.8	50.2	21.0	22.6
Incr Delay (d2), s/veh	13.4	1.3	2.4	12.6	24.5	36.3	15.5	0.0	1.0	25.0	0.2	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	11.9	13.2	0.9	25.2	28.1	1.4	0.0	2.9	8.9	1.0	3.3
LnGrp Delay(d),s/veh	70.3	31.5	32.5	69.7	61.1	72.9	72.2	0.0	31.8	75.2	21.2	23.4
LnGrp LOS	E	C	C	E	E	F	E		C	E	C	C
Approach Vol, veh/h		1369			1972			151			649	
Approach Delay, s/veh		32.7			65.1			41.7			59.0	
Approach LOS		C			E			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.0	40.1	7.2	49.7	8.0	53.1	7.6	49.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	16.5	35.6	5.9	44.0	6.9	45.2	5.1	44.8
Max Q Clear Time (g_c+I1), s	17.2	7.8	3.6	27.0	4.4	9.3	4.0	46.8
Green Ext Time (p_c), s	0.0	1.5	0.0	15.9	0.0	1.5	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	52.6
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	581	96	309	617	92	105	42	325	118	61	28
Future Volume (veh/h)	28	581	96	309	617	92	105	42	325	118	61	28
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	30	618	102	329	656	98	112	45	346	126	65	30
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	51	810	133	367	1372	205	526	710	604	440	460	213
Arrive On Green	0.03	0.27	0.27	0.21	0.44	0.44	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	1774	3043	501	1774	3090	461	1295	1863	1583	989	1207	557
Grp Volume(v), veh/h	30	359	361	329	375	379	112	45	346	126	0	95
Grp Sat Flow(s),veh/h/ln	1774	1770	1774	1774	1770	1781	1295	1863	1583	989	0	1764
Q Serve(g_s), s	1.6	17.3	17.4	16.8	13.9	13.9	5.7	1.4	16.1	8.6	0.0	3.3
Cycle Q Clear(g_c), s	1.6	17.3	17.4	16.8	13.9	13.9	9.0	1.4	16.1	10.0	0.0	3.3
Prop In Lane	1.00		0.28	1.00		0.26	1.00		1.00	1.00		0.32
Lane Grp Cap(c), veh/h	51	471	472	367	786	791	526	710	604	440	0	673
V/C Ratio(X)	0.58	0.76	0.76	0.90	0.48	0.48	0.21	0.06	0.57	0.29	0.00	0.14
Avail Cap(c_a), veh/h	115	526	528	449	860	866	526	710	604	440	0	673
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	44.5	31.3	31.4	35.8	18.2	18.2	21.7	18.2	22.7	21.4	0.0	18.8
Incr Delay (d2), s/veh	10.0	5.8	5.9	17.8	0.5	0.5	0.9	0.2	3.9	1.6	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	9.2	9.3	10.0	6.9	6.9	2.2	0.8	7.6	2.5	0.0	1.7
LnGrp Delay(d),s/veh	54.5	37.2	37.3	53.6	18.7	18.7	22.6	18.4	26.6	23.0	0.0	19.2
LnGrp LOS	D	D	D	D	B	B	C	B	C	C		B
Approach Vol, veh/h		750			1083			503			221	
Approach Delay, s/veh		37.9			29.3			25.0			21.4	
Approach LOS		D			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		39.9	23.7	29.2		39.9	7.2	45.7
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		35.4	23.5	27.6		35.4	6.0	45.1
Max Q Clear Time (g_c+I1), s		18.1	18.8	19.4		12.0	3.6	15.9
Green Ext Time (p_c), s		2.9	0.5	5.3		3.1	0.0	11.5

Intersection Summary	
HCM 2010 Ctrl Delay	30.3
HCM 2010 LOS	C

Intersection	
Intersection Delay, s/veh	24.3
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	17	260	184	43	284	14	200	54	23	23	91	10
Future Vol, veh/h	17	260	184	43	284	14	200	54	23	23	91	10
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	18	277	196	46	302	15	213	57	24	24	97	11
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	32	21.5	19.6	13.5
HCM LOS	D	C	C	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	72%	4%	13%	19%
Vol Thru, %	19%	56%	83%	73%
Vol Right, %	8%	40%	4%	8%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	277	461	341	124
LT Vol	200	17	43	23
Through Vol	54	260	284	91
RT Vol	23	184	14	10
Lane Flow Rate	295	490	363	132
Geometry Grp	1	1	1	1
Degree of Util (X)	0.583	0.827	0.657	0.279
Departure Headway (Hd)	7.124	6.171	6.641	7.607
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	510	589	548	474
Service Time	5.124	4.171	4.641	5.623
HCM Lane V/C Ratio	0.578	0.832	0.662	0.278
HCM Control Delay	19.6	32	21.5	13.5
HCM Lane LOS	C	D	C	B
HCM 95th-tile Q	3.7	8.5	4.8	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	1259	191	160	1266	13	52	7	174	9	33	27
Future Volume (veh/h)	10	1259	191	160	1266	13	52	7	174	9	33	27
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	10	1311	199	167	1319	14	54	7	181	9	34	28
Adj No. of Lanes	1	2	0	1	3	1	1	1	0	2	1	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	21	1391	209	191	2780	866	69	18	458	36	503	428
Arrive On Green	0.01	0.45	0.45	0.11	0.55	0.55	0.04	0.30	0.30	0.01	0.27	0.27
Sat Flow, veh/h	1774	3086	465	1774	5085	1583	1774	59	1533	3442	1863	1583
Grp Volume(v), veh/h	10	748	762	167	1319	14	54	0	188	9	34	28
Grp Sat Flow(s),veh/h/ln	1774	1770	1781	1774	1695	1583	1774	0	1592	1721	1863	1583
Q Serve(g_s), s	0.8	54.6	55.9	12.6	21.6	0.5	4.1	0.0	12.8	0.4	1.8	1.8
Cycle Q Clear(g_c), s	0.8	54.6	55.9	12.6	21.6	0.5	4.1	0.0	12.8	0.4	1.8	1.8
Prop In Lane	1.00		0.26	1.00		1.00	1.00		0.96	1.00		1.00
Lane Grp Cap(c), veh/h	21	798	803	191	2780	866	69	0	475	36	503	428
V/C Ratio(X)	0.49	0.94	0.95	0.88	0.47	0.02	0.78	0.00	0.40	0.25	0.07	0.07
Avail Cap(c_a), veh/h	67	814	819	202	2780	866	95	0	475	129	503	428
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.7	35.5	35.8	59.7	18.8	14.1	64.7	0.0	37.9	66.7	36.9	36.8
Incr Delay (d2), s/veh	16.8	18.0	20.1	31.0	0.1	0.0	23.6	0.0	2.5	3.5	0.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	30.6	31.8	7.8	10.0	0.2	2.5	0.0	5.9	0.2	1.0	0.8
LnGrp Delay(d),s/veh	83.5	53.4	55.9	90.7	19.0	14.1	88.3	0.0	40.3	70.1	37.1	37.1
LnGrp LOS	F	D	E	F	B	B	F		D	E	D	D
Approach Vol, veh/h		1520			1500			242			71	
Approach Delay, s/veh		54.9			26.9			51.0			41.3	
Approach LOS		D			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.9	45.1	19.1	65.7	9.8	41.2	6.1	78.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.1	38.9	15.5	62.5	7.3	36.7	5.1	72.9
Max Q Clear Time (g_c+I1), s	2.4	14.8	14.6	57.9	6.1	3.8	2.8	23.6
Green Ext Time (p_c), s	0.0	1.5	0.0	3.4	0.0	1.6	0.0	37.4

Intersection Summary	
HCM 2010 Ctrl Delay	41.7
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	782	688	0	1318	267	166	0	524	0	0	0
Future Volume (veh/h)	0	782	688	0	1318	267	166	0	524	0	0	0
Number	7	4	14	3	8	18	5	2	12			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	0	1863	1863	0	1863	1863	1900	1863	1863			
Adj Flow Rate, veh/h	0	942	0	0	1588	0	200	323	416			
Adj No. of Lanes	0	3	1	0	3	1	0	1	1			
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83			
Percent Heavy Veh, %	0	2	2	0	2	2	2	2	2			
Cap, veh/h	0	2227	693	0	2227	693	328	530	743			
Arrive On Green	0.00	0.44	0.00	0.00	0.44	0.00	0.47	0.47	0.47			
Sat Flow, veh/h	0	5253	1583	0	5253	1583	699	1129	1583			
Grp Volume(v), veh/h	0	942	0	0	1588	0	523	0	416			
Grp Sat Flow(s),veh/h/ln	0	1695	1583	0	1695	1583	1828	0	1583			
Q Serve(g_s), s	0.0	12.4	0.0	0.0	24.7	0.0	20.6	0.0	18.3			
Cycle Q Clear(g_c), s	0.0	12.4	0.0	0.0	24.7	0.0	20.6	0.0	18.3			
Prop In Lane	0.00		1.00	0.00		1.00	0.38		1.00			
Lane Grp Cap(c), veh/h	0	2227	693	0	2227	693	858	0	743			
V/C Ratio(X)	0.00	0.42	0.00	0.00	0.71	0.00	0.61	0.00	0.56			
Avail Cap(c_a), veh/h	0	2386	743	0	2386	743	858	0	743			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	18.8	0.0	0.0	22.3	0.0	19.1	0.0	18.5			
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.9	0.0	3.2	0.0	3.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	5.8	0.0	0.0	11.7	0.0	11.1	0.0	8.6			
LnGrp Delay(d),s/veh	0.0	18.9	0.0	0.0	23.2	0.0	22.4	0.0	21.6			
LnGrp LOS		B			C		C		C			
Approach Vol, veh/h		942			1588			939				
Approach Delay, s/veh		18.9			23.2			22.0				
Approach LOS		B			C			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		50.0		47.0				47.0
Change Period (Y+Rc), s		4.5		4.5				4.5
Max Green Setting (Gmax), s		45.5		45.5				45.5
Max Q Clear Time (g_c+I1), s		22.6		14.4				26.7
Green Ext Time (p_c), s		5.2		23.8				15.7

Intersection Summary	
HCM 2010 Ctrl Delay	21.7
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	287	602	168	259	881	94	119	97	81	90	302	339
Future Volume (veh/h)	287	602	168	259	881	94	119	97	81	90	302	339
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	334	700	195	301	1024	109	138	113	94	105	351	394
Adj No. of Lanes	2	2	1	2	3	1	1	2	0	1	2	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	405	1046	468	368	1447	451	166	731	560	130	641	574
Arrive On Green	0.12	0.30	0.30	0.11	0.28	0.28	0.09	0.38	0.38	0.07	0.36	0.36
Sat Flow, veh/h	3442	3539	1583	3442	5085	1583	1774	1911	1463	1774	1770	1583
Grp Volume(v), veh/h	334	700	195	301	1024	109	138	104	103	105	351	394
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1721	1695	1583	1774	1770	1605	1774	1770	1583
Q Serve(g_s), s	12.0	22.0	12.5	10.9	22.9	6.7	9.7	4.9	5.4	7.4	20.0	26.8
Cycle Q Clear(g_c), s	12.0	22.0	12.5	10.9	22.9	6.7	9.7	4.9	5.4	7.4	20.0	26.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.91	1.00		1.00
Lane Grp Cap(c), veh/h	405	1046	468	368	1447	451	166	677	614	130	641	574
V/C Ratio(X)	0.82	0.67	0.42	0.82	0.71	0.24	0.83	0.15	0.17	0.81	0.55	0.69
Avail Cap(c_a), veh/h	692	1242	556	583	1624	506	301	677	614	245	641	574
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.7	39.2	35.9	55.4	40.6	34.9	56.5	25.7	25.8	57.9	32.2	34.3
Incr Delay (d2), s/veh	4.3	1.1	0.6	5.0	1.3	0.3	10.3	0.5	0.6	11.1	3.3	6.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.9	11.0	5.6	5.4	10.9	3.0	5.2	2.5	2.5	4.0	10.3	12.8
LnGrp Delay(d),s/veh	58.9	40.3	36.5	60.5	41.9	35.1	66.9	26.2	26.4	69.0	35.5	40.9
LnGrp LOS	E	D	D	E	D	D	E	C	C	E	D	D
Approach Vol, veh/h		1229			1434			345			850	
Approach Delay, s/veh		44.8			45.3			42.5			42.1	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.8	53.0	18.0	42.0	16.3	50.5	19.4	40.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	17.5	48.5	21.5	44.5	21.5	44.5	25.5	40.5
Max Q Clear Time (g_c+I1), s	9.4	7.4	12.9	24.0	11.7	28.8	14.0	24.9
Green Ext Time (p_c), s	0.1	7.6	0.7	13.5	0.2	5.6	0.9	11.1

Intersection Summary	
HCM 2010 Ctrl Delay	44.2
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	147	128	236	188	166	113	193	54	164	464	46
Future Volume (veh/h)	35	147	128	236	188	166	113	193	54	164	464	46
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	36	152	132	243	194	171	116	199	56	169	478	47
Adj No. of Lanes	1	2	0	1	1	1	1	2	1	1	2	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	58	270	219	278	501	426	147	1361	609	203	1472	658
Arrive On Green	0.03	0.15	0.15	0.16	0.27	0.27	0.08	0.38	0.38	0.11	0.42	0.42
Sat Flow, veh/h	1774	1861	1506	1774	1863	1583	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	36	144	140	243	194	171	116	199	56	169	478	47
Grp Sat Flow(s),veh/h/ln	1774	1770	1597	1774	1863	1583	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	1.8	6.9	7.4	12.1	7.7	8.0	5.8	3.3	2.0	8.4	8.3	1.6
Cycle Q Clear(g_c), s	1.8	6.9	7.4	12.1	7.7	8.0	5.8	3.3	2.0	8.4	8.3	1.6
Prop In Lane	1.00		0.94	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	58	257	232	278	501	426	147	1361	609	203	1472	658
V/C Ratio(X)	0.62	0.56	0.60	0.87	0.39	0.40	0.79	0.15	0.09	0.83	0.32	0.07
Avail Cap(c_a), veh/h	131	780	704	310	1009	858	302	1361	609	226	1472	658
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.2	36.0	36.2	37.3	27.0	27.1	40.7	18.1	17.8	39.2	17.8	15.9
Incr Delay (d2), s/veh	10.1	1.9	2.5	21.4	0.5	0.6	8.9	0.2	0.3	21.1	0.6	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	3.5	3.4	7.6	4.0	3.5	3.2	1.6	0.9	5.3	4.2	0.7
LnGrp Delay(d),s/veh	53.3	37.9	38.7	58.6	27.5	27.7	49.6	18.4	18.1	60.3	18.4	16.1
LnGrp LOS	D	D	D	E	C	C	D	B	B	E	B	B
Approach Vol, veh/h		320			608			371			694	
Approach Delay, s/veh		40.0			40.0			28.1			28.5	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.8	39.3	18.7	17.6	12.0	42.1	7.5	28.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	11.5	34.8	15.8	39.9	15.4	30.9	6.7	49.0
Max Q Clear Time (g_c+I1), s	10.4	5.3	14.1	9.4	7.8	10.3	3.8	10.0
Green Ext Time (p_c), s	0.0	5.4	0.1	3.7	0.1	4.9	0.0	3.8

Intersection Summary	
HCM 2010 Ctrl Delay	33.8
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	38	4	37	3	5	2	24	430	2	1	644	154
Future Volume (veh/h)	38	4	37	3	5	2	24	430	2	1	644	154
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	42	4	41	3	5	2	26	473	2	1	708	169
Adj No. of Lanes	1	1	1	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	110	115	98	7	11	5	51	2315	10	3	1738	415
Arrive On Green	0.06	0.06	0.06	0.01	0.01	0.01	0.03	0.64	0.64	0.00	0.61	0.61
Sat Flow, veh/h	1774	1863	1583	532	887	355	1774	3614	15	1774	2836	677
Grp Volume(v), veh/h	42	4	41	10	0	0	26	232	243	1	442	435
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	0	0	1774	1770	1860	1774	1770	1743
Q Serve(g_s), s	1.4	0.1	1.6	0.4	0.0	0.0	0.9	3.4	3.4	0.0	8.2	8.2
Cycle Q Clear(g_c), s	1.4	0.1	1.6	0.4	0.0	0.0	0.9	3.4	3.4	0.0	8.2	8.2
Prop In Lane	1.00		1.00	0.30		0.20	1.00		0.01	1.00		0.39
Lane Grp Cap(c), veh/h	110	115	98	23	0	0	51	1133	1191	3	1085	1068
V/C Ratio(X)	0.38	0.03	0.42	0.44	0.00	0.00	0.51	0.20	0.20	0.36	0.41	0.41
Avail Cap(c_a), veh/h	869	913	776	154	0	0	182	1133	1191	154	1085	1068
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.6	28.0	28.7	31.1	0.0	0.0	30.4	4.7	4.7	31.7	6.3	6.3
Incr Delay (d2), s/veh	2.2	0.1	2.8	13.0	0.0	0.0	7.5	0.4	0.4	63.5	1.1	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.1	0.8	0.3	0.0	0.0	0.6	1.8	1.9	0.1	4.3	4.2
LnGrp Delay(d),s/veh	30.8	28.1	31.5	44.1	0.0	0.0	37.9	5.1	5.1	95.2	7.5	7.5
LnGrp LOS	C	C	C	D			D	A	A	F	A	A
Approach Vol, veh/h		87			10			501			878	
Approach Delay, s/veh		31.0			44.1			6.8			7.6	
Approach LOS		C			D			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.6	45.2		8.4	6.3	43.4		5.3
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5
Max Green Setting (Gmax), s	5.5	39.9		31.1	6.5	38.9		5.5
Max Q Clear Time (g_c+I1), s	2.0	5.4		3.6	2.9	10.2		2.4
Green Ext Time (p_c), s	0.0	11.0		0.2	0.0	10.3		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	8.9
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	9	85	28	3	6	132	301	16	5	713	21
Future Volume (veh/h)	16	9	85	28	3	6	132	301	16	5	713	21
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	17	10	92	30	3	7	143	327	17	5	775	23
Adj No. of Lanes	1	1	1	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	36	155	132	57	168	151	184	2081	108	12	1793	53
Arrive On Green	0.02	0.08	0.08	0.03	0.10	0.10	0.10	0.61	0.61	0.01	0.51	0.51
Sat Flow, veh/h	1774	1863	1583	1774	1770	1583	1774	3424	177	1774	3510	104
Grp Volume(v), veh/h	17	10	92	30	3	7	143	168	176	5	391	407
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1770	1583	1774	1770	1831	1774	1770	1844
Q Serve(g_s), s	0.6	0.3	3.8	1.1	0.1	0.3	5.2	2.7	2.8	0.2	9.2	9.2
Cycle Q Clear(g_c), s	0.6	0.3	3.8	1.1	0.1	0.3	5.2	2.7	2.8	0.2	9.2	9.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.10	1.00		0.06
Lane Grp Cap(c), veh/h	36	155	132	57	168	151	184	1076	1113	12	904	942
V/C Ratio(X)	0.47	0.06	0.70	0.53	0.02	0.05	0.78	0.16	0.16	0.42	0.43	0.43
Avail Cap(c_a), veh/h	133	867	737	146	837	749	386	1076	1113	133	904	942
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.3	28.1	29.7	31.8	27.3	27.4	29.1	5.7	5.7	33.0	10.2	10.2
Incr Delay (d2), s/veh	9.3	0.2	6.4	7.4	0.0	0.1	6.9	0.3	0.3	22.5	1.5	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.2	1.9	0.7	0.1	0.1	2.9	1.4	1.5	0.2	4.8	5.0
LnGrp Delay(d),s/veh	41.6	28.3	36.2	39.2	27.4	27.5	36.1	6.0	6.0	55.4	11.7	11.7
LnGrp LOS	D	C	D	D	C	C	D	A	A	E	B	B
Approach Vol, veh/h		119			40			487			803	
Approach Delay, s/veh		36.3			36.3			14.8			12.0	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	4.9	45.0	6.6	10.1	11.4	38.5	5.8	10.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	40.5	5.5	31.0	14.5	31.0	5.0	31.5
Max Q Clear Time (g_c+I1), s	2.2	4.8	3.1	5.8	7.2	11.2	2.6	2.3
Green Ext Time (p_c), s	0.0	8.7	0.0	0.4	0.2	7.2	0.0	0.4

Intersection Summary	
HCM 2010 Ctrl Delay	15.6
HCM 2010 LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	279	368	1070	969	258	304
Future Volume (vph)	279	368	1070	969	258	304
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.97	1.00	0.91	1.00	0.97	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	1583	5085	1583	3433	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	1583	5085	1583	3433	3539
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	310	409	1189	1077	287	338
RTOR Reduction (vph)	0	184	0	454	0	0
Lane Group Flow (vph)	310	225	1189	623	287	338
Turn Type	Perm	Perm	NA	Perm	Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2		
Actuated Green, G (s)	16.3	16.3	37.4	37.4	9.6	51.5
Effective Green, g (s)	16.3	16.3	37.4	37.4	9.6	51.5
Actuated g/C Ratio	0.21	0.21	0.49	0.49	0.12	0.67
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	728	335	2476	770	429	2373
v/s Ratio Prot			0.23		c0.08	0.10
v/s Ratio Perm	0.09	c0.14		c0.39		
v/c Ratio	0.43	0.67	0.48	0.81	0.67	0.14
Uniform Delay, d1	26.2	27.8	13.2	16.7	32.1	4.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	5.3	0.7	9.0	3.9	0.1
Delay (s)	26.6	33.1	13.9	25.6	36.0	4.7
Level of Service	C	C	B	C	D	A
Approach Delay (s)	30.3		19.5			19.1
Approach LOS	C		B			B

Intersection Summary			
HCM 2000 Control Delay	21.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	76.8	Sum of lost time (s)	13.5
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	192	995	83	468	559	512	52	302	600	477	174	71
Future Volume (veh/h)	192	995	83	468	559	512	52	302	600	477	174	71
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	216	1118	93	526	628	575	58	339	674	536	196	80
Adj No. of Lanes	2	4	0	2	3	1	2	1	2	2	2	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	265	1379	114	577	1616	503	115	568	965	585	1098	433
Arrive On Green	0.08	0.23	0.23	0.17	0.32	0.32	0.03	0.30	0.30	0.17	0.44	0.44
Sat Flow, veh/h	3442	6077	503	3442	5085	1583	3548	1863	3167	3442	2481	978
Grp Volume(v), veh/h	216	883	328	526	628	575	58	339	674	536	138	138
Grp Sat Flow(s),veh/h/ln	1721	1602	1774	1721	1695	1583	1774	1863	1583	1721	1770	1690
Q Serve(g_s), s	8.5	24.0	24.2	20.7	13.3	43.8	2.2	21.3	25.9	21.1	6.5	6.8
Cycle Q Clear(g_c), s	8.5	24.0	24.2	20.7	13.3	43.8	2.2	21.3	25.9	21.1	6.5	6.8
Prop In Lane	1.00		0.28	1.00		1.00	1.00		1.00	1.00		0.58
Lane Grp Cap(c), veh/h	265	1091	403	577	1616	503	115	568	965	585	783	748
V/C Ratio(X)	0.82	0.81	0.81	0.91	0.39	1.14	0.51	0.60	0.70	0.92	0.18	0.18
Avail Cap(c_a), veh/h	292	1091	403	612	1616	503	147	568	965	612	783	748
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	62.7	50.5	50.5	56.4	36.6	47.0	65.6	40.7	42.3	56.2	23.2	23.3
Incr Delay (d2), s/veh	15.1	4.7	12.2	17.4	0.2	85.8	3.4	4.6	4.2	18.2	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	11.1	13.2	11.3	6.2	31.1	1.1	11.7	11.9	11.5	3.3	3.3
LnGrp Delay(d),s/veh	77.7	55.1	62.7	73.8	36.8	132.8	69.0	45.3	46.5	74.4	23.7	23.9
LnGrp LOS	E	E	E	E	D	F	E	D	D	E	C	C
Approach Vol, veh/h		1427			1729			1071			812	
Approach Delay, s/veh		60.3			80.0			47.4			57.2	
Approach LOS		E			E			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	27.9	46.5	27.6	35.8	9.0	65.5	15.1	48.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	24.5	42.0	24.5	31.0	5.7	60.8	11.7	43.8
Max Q Clear Time (g_c+I1), s	23.1	27.9	22.7	26.2	4.2	8.8	10.5	45.8
Green Ext Time (p_c), s	0.3	5.9	0.4	4.3	0.0	8.4	0.1	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	63.8
HCM 2010 LOS	E

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	162	601	116	64	639	105	108	372	142	91	126	67
Future Volume (veh/h)	162	601	116	64	639	105	108	372	142	91	126	67
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	167	620	120	66	659	108	111	384	146	94	130	69
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	201	993	192	85	823	135	140	663	563	120	395	210
Arrive On Green	0.11	0.34	0.34	0.05	0.27	0.27	0.08	0.36	0.36	0.07	0.34	0.34
Sat Flow, veh/h	1774	2960	572	1774	3046	499	1774	1863	1583	1774	1147	609
Grp Volume(v), veh/h	167	370	370	66	383	384	111	384	146	94	0	199
Grp Sat Flow(s),veh/h/ln	1774	1770	1762	1774	1770	1775	1774	1863	1583	1774	0	1755
Q Serve(g_s), s	8.6	16.4	16.4	3.4	18.7	18.8	5.7	15.6	6.1	4.9	0.0	7.8
Cycle Q Clear(g_c), s	8.6	16.4	16.4	3.4	18.7	18.8	5.7	15.6	6.1	4.9	0.0	7.8
Prop In Lane	1.00		0.32	1.00		0.28	1.00		1.00	1.00		0.35
Lane Grp Cap(c), veh/h	201	594	591	85	478	479	140	663	563	120	0	605
V/C Ratio(X)	0.83	0.62	0.63	0.78	0.80	0.80	0.80	0.58	0.26	0.79	0.00	0.33
Avail Cap(c_a), veh/h	255	648	645	122	515	516	179	663	563	160	0	605
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.4	26.0	26.0	43.9	31.6	31.7	42.2	24.3	21.3	42.8	0.0	22.6
Incr Delay (d2), s/veh	16.5	1.6	1.7	17.8	8.2	8.3	17.1	3.7	1.1	16.6	0.0	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	8.3	8.3	2.1	10.2	10.3	3.5	8.7	2.8	2.9	0.0	4.0
LnGrp Delay(d),s/veh	57.0	27.6	27.7	61.7	39.9	40.0	59.3	28.0	22.4	59.4	0.0	24.0
LnGrp LOS	E	C	C	E	D	D	E	C	C	E		C
Approach Vol, veh/h		907			833			641			293	
Approach Delay, s/veh		33.0			41.7			32.1			35.4	
Approach LOS		C			D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.8	37.6	9.0	35.8	11.8	36.6	15.1	29.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	8.4	33.1	6.4	34.1	9.4	32.1	13.4	27.1
Max Q Clear Time (g_c+I1), s	6.9	17.6	5.4	18.4	7.7	9.8	10.6	20.8
Green Ext Time (p_c), s	0.0	3.7	0.0	8.6	0.0	4.2	0.1	4.4

Intersection Summary	
HCM 2010 Ctrl Delay	35.8
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	184	67	47	1	129	439	72	1147	1	205	839	105
Future Volume (veh/h)	184	67	47	1	129	439	72	1147	1	205	839	105
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	202	74	52	1	142	482	79	1260	1	225	922	115
Adj No. of Lanes	1	1	1	1	1	1	1	3	1	1	3	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	230	725	616	2	486	413	100	1625	506	253	2064	643
Arrive On Green	0.13	0.39	0.39	0.00	0.26	0.26	0.06	0.32	0.32	0.14	0.41	0.41
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	1774	5085	1583	1774	5085	1583
Grp Volume(v), veh/h	202	74	52	1	142	482	79	1260	1	225	922	115
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1695	1583	1774	1695	1583
Q Serve(g_s), s	13.7	3.1	2.5	0.1	7.5	31.9	5.4	27.4	0.1	15.2	16.1	5.7
Cycle Q Clear(g_c), s	13.7	3.1	2.5	0.1	7.5	31.9	5.4	27.4	0.1	15.2	16.1	5.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	230	725	616	2	486	413	100	1625	506	253	2064	643
V/C Ratio(X)	0.88	0.10	0.08	0.41	0.29	1.17	0.79	0.78	0.00	0.89	0.45	0.18
Avail Cap(c_a), veh/h	283	725	616	73	486	413	178	1625	506	312	2064	643
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.3	23.8	23.6	61.0	36.2	45.2	57.0	37.6	28.3	51.5	26.4	23.3
Incr Delay (d2), s/veh	22.2	0.1	0.1	85.3	0.3	98.6	12.6	3.7	0.0	22.1	0.7	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.2	1.6	1.1	0.1	3.9	25.2	3.0	13.4	0.0	9.0	7.6	2.6
LnGrp Delay(d),s/veh	74.5	23.8	23.7	146.3	36.5	143.8	69.6	41.3	28.3	73.6	27.1	23.9
LnGrp LOS	E	C	C	F	D	F	E	D	C	E	C	C
Approach Vol, veh/h		328			625			1340			1262	
Approach Delay, s/veh		55.0			119.4			43.0			35.1	
Approach LOS		E			F			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.0	43.6	4.7	52.1	11.4	54.1	20.4	36.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	21.5	39.1	5.0	46.4	12.3	48.3	19.5	31.9
Max Q Clear Time (g_c+I1), s	17.2	29.4	2.1	5.1	7.4	18.1	15.7	33.9
Green Ext Time (p_c), s	0.2	8.3	0.0	3.5	0.1	20.8	0.2	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	54.7
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	64	29	79	119	101	132	363	55	66	147	10
Future Volume (veh/h)	10	64	29	79	119	101	132	363	55	66	147	10
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	11	68	31	84	127	107	140	386	59	70	156	11
Adj No. of Lanes	1	1	0	1	1	1	1	1	1	1	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	24	126	57	109	282	240	180	973	827	95	816	58
Arrive On Green	0.01	0.10	0.10	0.06	0.15	0.15	0.10	0.52	0.52	0.05	0.47	0.47
Sat Flow, veh/h	1774	1212	553	1774	1863	1583	1774	1863	1583	1774	1720	121
Grp Volume(v), veh/h	11	0	99	84	127	107	140	386	59	70	0	167
Grp Sat Flow(s),veh/h/ln	1774	0	1765	1774	1863	1583	1774	1863	1583	1774	0	1841
Q Serve(g_s), s	0.4	0.0	3.7	3.2	4.3	4.3	5.3	8.7	1.3	2.7	0.0	3.6
Cycle Q Clear(g_c), s	0.4	0.0	3.7	3.2	4.3	4.3	5.3	8.7	1.3	2.7	0.0	3.6
Prop In Lane	1.00		0.31	1.00		1.00	1.00		1.00	1.00		0.07
Lane Grp Cap(c), veh/h	24	0	183	109	282	240	180	973	827	95	0	873
V/C Ratio(X)	0.45	0.00	0.54	0.77	0.45	0.45	0.78	0.40	0.07	0.74	0.00	0.19
Avail Cap(c_a), veh/h	140	0	628	268	796	677	421	973	827	268	0	873
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	34.0	0.0	29.6	32.1	26.8	26.8	30.4	10.0	8.2	32.4	0.0	10.6
Incr Delay (d2), s/veh	12.4	0.0	2.5	11.0	1.1	1.3	7.0	1.2	0.2	10.7	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	1.9	1.9	2.3	2.0	3.0	4.7	0.6	1.6	0.0	2.0
LnGrp Delay(d),s/veh	46.4	0.0	32.0	43.1	28.0	28.1	37.4	11.2	8.4	43.1	0.0	11.1
LnGrp LOS	D		C	D	C	C	D	B	A	D		B
Approach Vol, veh/h		110			318			585			237	
Approach Delay, s/veh		33.5			32.0			17.2			20.5	
Approach LOS		C			C			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.2	40.8	8.8	11.7	11.6	37.4	5.5	15.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	36.3	10.5	24.7	16.5	30.3	5.5	29.7
Max Q Clear Time (g_c+I1), s	4.7	10.7	5.2	5.7	7.3	5.6	2.4	6.3
Green Ext Time (p_c), s	0.1	3.8	0.1	1.5	0.2	3.7	0.0	1.6

Intersection Summary	
HCM 2010 Ctrl Delay	23.0
HCM 2010 LOS	C

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	50	256	261	15	86	159
Future Volume (veh/h)	50	256	261	15	86	159
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	53	269	275	16	91	167
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	347	310	1096	931	118	1312
Arrive On Green	0.20	0.20	0.59	0.59	0.07	0.70
Sat Flow, veh/h	1774	1583	1863	1583	1774	1863
Grp Volume(v), veh/h	53	269	275	16	91	167
Grp Sat Flow(s),veh/h/ln	1774	1583	1863	1583	1774	1863
Q Serve(g_s), s	2.2	14.8	6.4	0.4	4.5	2.6
Cycle Q Clear(g_c), s	2.2	14.8	6.4	0.4	4.5	2.6
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	347	310	1096	931	118	1312
V/C Ratio(X)	0.15	0.87	0.25	0.02	0.77	0.13
Avail Cap(c_a), veh/h	541	483	1096	931	325	1312
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.1	35.1	9.0	7.7	41.4	4.3
Incr Delay (d2), s/veh	0.2	10.0	0.5	0.0	10.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	7.3	3.5	0.2	2.6	1.4
LnGrp Delay(d),s/veh	30.3	45.1	9.5	7.8	51.5	4.5
LnGrp LOS	C	D	A	A	D	A
Approach Vol, veh/h	322		291			258
Approach Delay, s/veh	42.7		9.4			21.1
Approach LOS	D		A			C

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	10.5	57.5				68.0		22.1
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	16.5	42.5				63.5		27.5
Max Q Clear Time (g_c+I1), s	6.5	8.4				4.6		16.8
Green Ext Time (p_c), s	0.1	2.9				3.0		0.8

Intersection Summary	
HCM 2010 Ctrl Delay	25.2
HCM 2010 LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	982	117	423	956	198	710
Future Volume (vph)	982	117	423	956	198	710
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5	4.5	4.5	4.5
Lane Util. Factor	0.95		1.00	0.95	0.97	0.91
Frt	0.98		1.00	1.00	0.90	0.85
Flt Protected	1.00		0.95	1.00	0.98	1.00
Satd. Flow (prot)	3483		1770	3539	3208	1441
Flt Permitted	1.00		0.95	1.00	0.98	1.00
Satd. Flow (perm)	3483		1770	3539	3208	1441
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	1002	119	432	976	202	724
RTOR Reduction (vph)	7	0	0	0	257	257
Lane Group Flow (vph)	1114	0	432	976	307	105
Turn Type	NA		Prot	NA	Perm	Perm
Protected Phases	4		3	8		
Permitted Phases					2	2
Actuated Green, G (s)	39.5		31.1	75.1	34.5	34.5
Effective Green, g (s)	39.5		31.1	75.1	34.5	34.5
Actuated g/C Ratio	0.33		0.26	0.63	0.29	0.29
Clearance Time (s)	4.5		4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1160		464	2240	933	419
v/s Ratio Prot	c0.32		c0.24	0.28		
v/s Ratio Perm					c0.10	0.07
v/c Ratio	0.96		0.93	0.44	0.33	0.25
Uniform Delay, d1	38.8		42.7	11.0	33.0	32.2
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	17.6		25.5	0.1	0.9	1.4
Delay (s)	56.4		68.2	11.2	33.9	33.6
Level of Service	E		E	B	C	C
Approach Delay (s)	56.4			28.7	33.8	
Approach LOS	E			C	C	

Intersection Summary			
HCM 2000 Control Delay	39.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	118.6	Sum of lost time (s)	13.5
Intersection Capacity Utilization	78.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	508	180	134	447	278	251	440	461	149	143	20
Future Volume (veh/h)	14	508	180	134	447	278	251	440	461	149	143	20
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	14	524	186	138	461	287	259	454	475	154	147	21
Adj No. of Lanes	1	2	1	1	1	1	1	1	1	1	2	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	28	869	389	158	594	505	288	730	621	184	1040	146
Arrive On Green	0.02	0.25	0.25	0.09	0.32	0.32	0.16	0.39	0.39	0.10	0.33	0.33
Sat Flow, veh/h	1774	3539	1583	1774	1863	1583	1774	1863	1583	1774	3117	438
Grp Volume(v), veh/h	14	524	186	138	461	287	259	454	475	154	82	86
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1863	1583	1774	1863	1583	1774	1770	1785
Q Serve(g_s), s	0.8	13.9	10.7	8.2	23.8	16.0	15.2	20.8	27.7	9.1	3.5	3.6
Cycle Q Clear(g_c), s	0.8	13.9	10.7	8.2	23.8	16.0	15.2	20.8	27.7	9.1	3.5	3.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.25
Lane Grp Cap(c), veh/h	28	869	389	158	594	505	288	730	621	184	591	596
V/C Ratio(X)	0.50	0.60	0.48	0.87	0.78	0.57	0.90	0.62	0.77	0.84	0.14	0.14
Avail Cap(c_a), veh/h	83	1314	588	158	771	655	292	730	621	237	591	596
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.9	35.5	34.3	47.8	32.8	30.1	43.7	26.0	28.1	46.8	24.8	24.8
Incr Delay (d2), s/veh	12.8	0.7	0.9	37.3	3.7	1.0	28.5	4.0	8.7	18.0	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	6.9	4.8	5.6	12.9	7.1	9.8	11.5	13.6	5.4	1.8	1.8
LnGrp Delay(d),s/veh	64.7	36.2	35.2	85.1	36.5	31.1	72.2	30.0	36.8	64.8	25.3	25.3
LnGrp LOS	E	D	D	F	D	C	E	C	D	E	C	C
Approach Vol, veh/h		724			886			1188			322	
Approach Delay, s/veh		36.5			42.3			41.9			44.2	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.6	46.2	14.0	30.6	21.7	40.0	6.2	38.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	14.2	38.8	9.5	39.5	17.5	35.5	5.0	44.0
Max Q Clear Time (g_c+I1), s	11.1	29.7	10.2	15.9	17.2	5.6	2.8	25.8
Green Ext Time (p_c), s	0.1	3.9	0.0	9.1	0.0	6.4	0.0	8.1

Intersection Summary	
HCM 2010 Ctrl Delay	41.0
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	545	705	175	310	676	93	161	1570	179	172	1059	508
Future Volume (veh/h)	545	705	175	310	676	93	161	1570	179	172	1059	508
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	562	727	180	320	697	96	166	1619	185	177	1092	524
Adj No. of Lanes	2	3	1	2	2	1	2	3	1	2	3	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	613	1716	534	381	956	428	217	1794	559	216	1793	558
Arrive On Green	0.18	0.34	0.34	0.11	0.27	0.27	0.06	0.35	0.35	0.06	0.35	0.35
Sat Flow, veh/h	3442	5085	1583	3442	3539	1583	3442	5085	1583	3442	5085	1583
Grp Volume(v), veh/h	562	727	180	320	697	96	166	1619	185	177	1092	524
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1770	1583	1721	1695	1583	1721	1695	1583
Q Serve(g_s), s	21.2	14.6	11.2	12.0	23.6	6.2	6.3	39.9	11.3	6.7	23.4	42.3
Cycle Q Clear(g_c), s	21.2	14.6	11.2	12.0	23.6	6.2	6.3	39.9	11.3	6.7	23.4	42.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	613	1716	534	381	956	428	217	1794	559	216	1793	558
V/C Ratio(X)	0.92	0.42	0.34	0.84	0.73	0.22	0.77	0.90	0.33	0.82	0.61	0.94
Avail Cap(c_a), veh/h	638	1817	566	518	1141	511	248	1794	559	216	1793	558
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.3	33.8	32.7	57.6	43.8	37.5	60.9	40.6	31.3	61.2	35.2	41.4
Incr Delay (d2), s/veh	17.8	0.2	0.4	8.8	1.9	0.3	11.8	7.9	1.6	21.3	1.5	25.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.6	6.9	5.0	6.2	11.8	2.8	3.4	19.9	5.2	3.8	11.2	22.4
LnGrp Delay(d),s/veh	71.1	34.0	33.1	66.4	45.8	37.7	72.8	48.5	32.9	82.5	36.8	66.9
LnGrp LOS	E	C	C	E	D	D	E	D	C	F	D	E
Approach Vol, veh/h		1469			1113			1970			1793	
Approach Delay, s/veh		48.1			51.0			49.1			50.1	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.8	51.1	19.1	49.1	12.8	51.1	28.0	40.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	8.3	46.6	19.9	47.2	9.5	45.4	24.5	42.6
Max Q Clear Time (g_c+I1), s	8.7	41.9	14.0	16.6	8.3	44.3	23.2	25.6
Green Ext Time (p_c), s	0.0	4.5	0.6	13.9	0.1	1.1	0.3	10.0

Intersection Summary	
HCM 2010 Ctrl Delay	49.5
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	131	994	53	151	630	273	171	336	315	492	171	115
Future Volume (veh/h)	131	994	53	151	630	273	171	336	315	492	171	115
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	138	1046	56	159	663	287	180	354	332	518	180	121
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	2	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	162	1172	63	183	854	370	205	450	403	573	318	214
Arrive On Green	0.09	0.34	0.34	0.10	0.35	0.35	0.12	0.25	0.25	0.17	0.31	0.31
Sat Flow, veh/h	1774	3417	183	1774	2407	1042	1774	1770	1583	3442	1040	699
Grp Volume(v), veh/h	138	542	560	159	487	463	180	354	332	518	0	301
Grp Sat Flow(s),veh/h/ln	1774	1770	1830	1774	1770	1679	1774	1770	1583	1721	0	1739
Q Serve(g_s), s	10.4	39.3	39.3	12.0	33.3	33.3	13.5	25.3	26.8	20.0	0.0	19.7
Cycle Q Clear(g_c), s	10.4	39.3	39.3	12.0	33.3	33.3	13.5	25.3	26.8	20.0	0.0	19.7
Prop In Lane	1.00		0.10	1.00		0.62	1.00		1.00	1.00		0.40
Lane Grp Cap(c), veh/h	162	607	628	183	628	596	205	450	403	573	0	531
V/C Ratio(X)	0.85	0.89	0.89	0.87	0.78	0.78	0.88	0.79	0.82	0.90	0.00	0.57
Avail Cap(c_a), veh/h	195	620	641	203	628	596	245	450	403	622	0	531
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	60.7	42.2	42.2	59.9	38.9	38.9	59.0	47.1	47.7	55.4	0.0	39.5
Incr Delay (d2), s/veh	25.0	15.0	14.7	28.8	6.1	6.4	25.4	12.9	17.2	16.0	0.0	4.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.2	21.6	22.3	7.3	17.3	16.5	8.1	14.0	13.6	10.8	0.0	10.1
LnGrp Delay(d),s/veh	85.6	57.2	56.8	88.7	45.0	45.4	84.4	60.0	64.8	71.4	0.0	43.9
LnGrp LOS	F	E	E	F	D	D	F	E	E	E		D
Approach Vol, veh/h		1240			1109			866			819	
Approach Delay, s/veh		60.2			51.4			66.9			61.3	
Approach LOS		E			D			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	27.1	39.0	18.5	51.0	20.2	45.9	16.9	52.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	24.5	34.5	15.5	47.5	18.7	40.3	14.9	48.1
Max Q Clear Time (g_c+I1), s	22.0	28.8	14.0	41.3	15.5	21.7	12.4	35.3
Green Ext Time (p_c), s	0.5	3.0	0.1	5.2	0.1	6.3	0.1	9.8

Intersection Summary	
HCM 2010 Ctrl Delay	59.4
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1617	281	153	793	0	0	0	0	199	7	455
Future Volume (vph)	0	1617	281	153	793	0	0	0	0	199	7	455
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5		4.5	4.5					4.5	4.5	4.5
Lane Util. Factor		0.91		0.97	0.95					0.95	0.91	0.95
Frt		0.98		1.00	1.00					1.00	0.87	0.85
Flt Protected		1.00		0.95	1.00					0.95	1.00	1.00
Satd. Flow (prot)		4972		3433	3539					1681	1463	1504
Flt Permitted		1.00		0.95	1.00					0.95	1.00	1.00
Satd. Flow (perm)		4972		3433	3539					1681	1463	1504
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	1684	293	159	826	0	0	0	0	207	7	474
RTOR Reduction (vph)	0	24	0	0	0	0	0	0	0	0	155	155
Lane Group Flow (vph)	0	1953	0	159	826	0	0	0	0	186	96	96
Turn Type		NA		Prot	NA					Prot	NA	Perm
Protected Phases		4		3	8					1	6	
Permitted Phases												6
Actuated Green, G (s)		49.9		8.8	63.2					25.5	25.5	25.5
Effective Green, g (s)		49.9		8.8	63.2					25.5	25.5	25.5
Actuated g/C Ratio		0.51		0.09	0.65					0.26	0.26	0.26
Clearance Time (s)		4.5		4.5	4.5					4.5	4.5	4.5
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	3.0
Lane Grp Cap (vph)		2539		309	2289					438	381	392
v/s Ratio Prot		c0.39		c0.05	0.23					c0.11	0.07	
v/s Ratio Perm												0.06
v/c Ratio		0.77		0.51	0.36					0.42	0.25	0.24
Uniform Delay, d1		19.3		42.4	7.9					30.0	28.6	28.5
Progression Factor		1.00		1.00	1.00					1.00	1.00	1.00
Incremental Delay, d2		1.5		1.4	0.1					0.7	0.3	1.5
Delay (s)		20.7		43.9	8.0					30.7	28.9	30.0
Level of Service		C		D	A					C	C	C
Approach Delay (s)		20.7			13.8			0.0			29.8	
Approach LOS		C			B			A			C	

Intersection Summary			
HCM 2000 Control Delay	20.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	97.7	Sum of lost time (s)	13.5
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	162	1676	39	38	1702	423	22	19	39	427	25	109
Future Volume (veh/h)	162	1676	39	38	1702	423	22	19	39	427	25	109
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	167	1728	40	39	1755	436	23	20	40	440	26	112
Adj No. of Lanes	1	3	0	1	3	0	1	1	0	2	1	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	171	2376	55	50	1619	394	37	140	280	435	666	566
Arrive On Green	0.10	0.46	0.46	0.03	0.40	0.40	0.02	0.25	0.25	0.13	0.36	0.36
Sat Flow, veh/h	1774	5114	118	1774	4083	994	1774	556	1111	3442	1863	1583
Grp Volume(v), veh/h	167	1145	623	39	1451	740	23	0	60	440	26	112
Grp Sat Flow(s),veh/h/ln	1774	1695	1842	1774	1695	1687	1774	0	1667	1721	1863	1583
Q Serve(g_s), s	13.1	38.2	38.3	3.1	55.5	55.5	1.8	0.0	3.9	17.7	1.3	6.8
Cycle Q Clear(g_c), s	13.1	38.2	38.3	3.1	55.5	55.5	1.8	0.0	3.9	17.7	1.3	6.8
Prop In Lane	1.00		0.06	1.00		0.59	1.00		0.67	1.00		1.00
Lane Grp Cap(c), veh/h	171	1575	856	50	1344	669	37	0	420	435	666	566
V/C Ratio(X)	0.98	0.73	0.73	0.78	1.08	1.11	0.61	0.00	0.14	1.01	0.04	0.20
Avail Cap(c_a), veh/h	171	1575	856	110	1344	669	77	0	420	435	666	566
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	63.1	30.3	30.3	67.6	42.3	42.3	68.0	0.0	40.6	61.2	29.3	31.1
Incr Delay (d2), s/veh	61.6	1.7	3.1	22.2	49.2	67.5	15.2	0.0	0.7	46.0	0.1	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.4	18.2	20.1	1.8	35.1	38.4	1.0	0.0	1.9	11.2	0.7	3.1
LnGrp Delay(d),s/veh	124.7	32.0	33.5	89.8	91.4	109.8	83.1	0.0	41.3	107.2	29.4	31.9
LnGrp LOS	F	C	C	F	F	F	F		D	F	C	C
Approach Vol, veh/h		1935			2230			83			578	
Approach Delay, s/veh		40.5			97.5			52.9			89.1	
Approach LOS		D			F			D			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.2	39.8	8.5	69.5	7.5	54.5	18.0	60.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	17.7	35.3	8.7	60.3	6.1	46.9	13.5	55.5
Max Q Clear Time (g_c+I1), s	19.7	5.9	5.1	40.3	3.8	8.8	15.1	57.5
Green Ext Time (p_c), s	0.0	0.8	0.0	19.5	0.0	0.9	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	72.8
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	778	76	338	687	115	66	43	241	100	45	22
Future Volume (veh/h)	52	778	76	338	687	115	66	43	241	100	45	22
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	54	802	78	348	708	119	68	44	248	103	46	23
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	71	895	87	383	1367	230	530	687	584	458	433	216
Arrive On Green	0.04	0.27	0.27	0.22	0.45	0.45	0.37	0.37	0.37	0.37	0.37	0.37
Sat Flow, veh/h	1774	3259	317	1774	3033	509	1326	1863	1583	1083	1173	586
Grp Volume(v), veh/h	54	435	445	348	413	414	68	44	248	103	0	69
Grp Sat Flow(s),veh/h/ln	1774	1770	1807	1774	1770	1773	1326	1863	1583	1083	0	1759
Q Serve(g_s), s	2.9	22.7	22.7	18.4	16.0	16.1	3.4	1.5	11.2	6.5	0.0	2.5
Cycle Q Clear(g_c), s	2.9	22.7	22.7	18.4	16.0	16.1	5.9	1.5	11.2	8.0	0.0	2.5
Prop In Lane	1.00		0.18	1.00		0.29	1.00		1.00	1.00		0.33
Lane Grp Cap(c), veh/h	71	486	496	383	798	799	530	687	584	458	0	649
V/C Ratio(X)	0.77	0.90	0.90	0.91	0.52	0.52	0.13	0.06	0.42	0.22	0.00	0.11
Avail Cap(c_a), veh/h	159	509	520	434	798	799	530	687	584	458	0	649
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	45.6	33.5	33.5	36.7	18.9	18.9	21.8	19.6	22.7	22.2	0.0	19.9
Incr Delay (d2), s/veh	15.7	17.9	17.6	21.2	0.6	0.6	0.5	0.2	2.3	1.1	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	13.5	13.8	11.2	7.9	8.0	1.3	0.8	5.3	2.1	0.0	1.3
LnGrp Delay(d),s/veh	61.3	51.4	51.1	57.9	19.5	19.5	22.3	19.8	24.9	23.3	0.0	20.2
LnGrp LOS	E	D	D	E	B	B	C	B	C	C		C
Approach Vol, veh/h		934			1175			360			172	
Approach Delay, s/veh		51.8			30.9			23.8			22.1	
Approach LOS		D			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		39.9	25.2	30.9		39.9	8.3	47.8
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		35.4	23.5	27.6		35.4	8.6	42.5
Max Q Clear Time (g_c+I1), s		13.2	20.4	24.7		10.0	4.9	18.1
Green Ext Time (p_c), s		2.1	0.4	1.6		2.2	0.0	12.7

Intersection Summary	
HCM 2010 Ctrl Delay	36.7
HCM 2010 LOS	D

Intersection	
Intersection Delay, s/veh	18.6
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	307	113	16	315	21	124	49	35	12	23	9
Future Vol, veh/h	15	307	113	16	315	21	124	49	35	12	23	9
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	17	349	128	18	358	24	141	56	40	14	26	10
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	22.2	17.7	14.1	10.8
HCM LOS	C	C	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	60%	3%	5%	27%
Vol Thru, %	24%	71%	89%	52%
Vol Right, %	17%	26%	6%	20%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	208	435	352	44
LT Vol	124	15	16	12
Through Vol	49	307	315	23
RT Vol	35	113	21	9
Lane Flow Rate	236	494	400	50
Geometry Grp	1	1	1	1
Degree of Util (X)	0.42	0.738	0.625	0.097
Departure Headway (Hd)	6.397	5.377	5.622	7.003
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	558	667	636	515
Service Time	4.488	3.454	3.703	5.003
HCM Lane V/C Ratio	0.423	0.741	0.629	0.097
HCM Control Delay	14.1	22.2	17.7	10.8
HCM Lane LOS	B	C	C	B
HCM 95th-tile Q	2.1	6.5	4.4	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	1701	23	125	1439	2	28	2	106	5	3	14
Future Volume (veh/h)	29	1701	23	125	1439	2	28	2	106	5	3	14
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	29	1718	23	126	1454	2	28	2	107	5	3	14
Adj No. of Lanes	1	2	0	1	3	1	1	1	0	2	1	1
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	43	1759	24	147	2799	871	43	8	447	22	501	426
Arrive On Green	0.02	0.49	0.49	0.08	0.55	0.55	0.02	0.29	0.29	0.01	0.27	0.27
Sat Flow, veh/h	1774	3576	48	1774	5085	1583	1774	29	1559	3442	1863	1583
Grp Volume(v), veh/h	29	849	892	126	1454	2	28	0	109	5	3	14
Grp Sat Flow(s),veh/h/ln	1774	1770	1854	1774	1695	1583	1774	0	1588	1721	1863	1583
Q Serve(g_s), s	2.2	63.8	64.1	9.5	24.5	0.1	2.1	0.0	7.2	0.2	0.2	0.9
Cycle Q Clear(g_c), s	2.2	63.8	64.1	9.5	24.5	0.1	2.1	0.0	7.2	0.2	0.2	0.9
Prop In Lane	1.00		0.03	1.00		1.00	1.00		0.98	1.00		1.00
Lane Grp Cap(c), veh/h	43	870	912	147	2799	871	43	0	455	22	501	426
V/C Ratio(X)	0.67	0.98	0.98	0.86	0.52	0.00	0.66	0.00	0.24	0.23	0.01	0.03
Avail Cap(c_a), veh/h	86	878	920	147	2799	871	86	0	455	129	501	426
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.8	33.8	33.9	61.6	19.3	13.8	65.9	0.0	37.2	67.3	36.4	36.7
Incr Delay (d2), s/veh	16.3	24.4	24.3	36.0	0.2	0.0	15.9	0.0	1.2	5.2	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	37.0	38.9	6.2	11.5	0.0	1.2	0.0	3.3	0.1	0.1	0.4
LnGrp Delay(d),s/veh	82.1	58.1	58.2	97.6	19.4	13.8	81.8	0.0	38.4	72.5	36.4	36.8
LnGrp LOS	F	E	E	F	B	B	F		D	E	D	D
Approach Vol, veh/h		1770			1582			137			22	
Approach Delay, s/veh		58.6			25.7			47.3			44.9	
Approach LOS		E			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.4	43.5	15.8	71.4	7.8	41.1	7.8	79.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.1	38.1	11.3	67.5	6.6	36.6	6.6	72.2
Max Q Clear Time (g_c+I1), s	2.2	9.2	11.5	66.1	4.1	2.9	4.2	26.5
Green Ext Time (p_c), s	0.0	0.7	0.0	0.8	0.0	0.7	0.0	39.1

Intersection Summary	
HCM 2010 Ctrl Delay	43.2
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1035	487	0	831	87	374	0	547	0	0	0
Future Volume (veh/h)	0	1035	487	0	831	87	374	0	547	0	0	0
Number	7	4	14	3	8	18	5	2	12			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	0	1863	1863	0	1863	1863	1900	1863	1863			
Adj Flow Rate, veh/h	0	1045	0	0	839	0	378	131	466			
Adj No. of Lanes	0	3	1	0	3	1	0	1	1			
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99			
Percent Heavy Veh, %	0	2	2	0	2	2	2	2	2			
Cap, veh/h	0	1808	563	0	1808	563	727	252	863			
Arrive On Green	0.00	0.36	0.00	0.00	0.36	0.00	0.55	0.55	0.55			
Sat Flow, veh/h	0	5253	1583	0	5253	1583	1334	462	1583			
Grp Volume(v), veh/h	0	1045	0	0	839	0	509	0	466			
Grp Sat Flow(s),veh/h/ln	0	1695	1583	0	1695	1583	1796	0	1583			
Q Serve(g_s), s	0.0	15.1	0.0	0.0	11.6	0.0	16.3	0.0	17.2			
Cycle Q Clear(g_c), s	0.0	15.1	0.0	0.0	11.6	0.0	16.3	0.0	17.2			
Prop In Lane	0.00		1.00	0.00		1.00	0.74		1.00			
Lane Grp Cap(c), veh/h	0	1808	563	0	1808	563	979	0	863			
V/C Ratio(X)	0.00	0.58	0.00	0.00	0.46	0.00	0.52	0.00	0.54			
Avail Cap(c_a), veh/h	0	2325	724	0	2325	724	979	0	863			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	23.7	0.0	0.0	22.6	0.0	13.1	0.0	13.3			
Incr Delay (d2), s/veh	0.0	0.3	0.0	0.0	0.2	0.0	2.0	0.0	2.4			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	7.1	0.0	0.0	5.4	0.0	8.6	0.0	8.1			
LnGrp Delay(d),s/veh	0.0	24.0	0.0	0.0	22.8	0.0	15.1	0.0	15.7			
LnGrp LOS		C			C		B		B			
Approach Vol, veh/h		1045			839			975				
Approach Delay, s/veh		24.0			22.8			15.4				
Approach LOS		C			C			B				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		54.0		36.8				36.8
Change Period (Y+Rc), s		4.5		4.5				4.5
Max Green Setting (Gmax), s		49.5		41.5				41.5
Max Q Clear Time (g_c+I1), s		19.2		17.1				13.6
Green Ext Time (p_c), s		5.8		15.1				16.5

Intersection Summary	
HCM 2010 Ctrl Delay	20.7
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	614	761	202	102	439	70	165	513	128	82	246	272
Future Volume (veh/h)	614	761	202	102	439	70	165	513	128	82	246	272
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	640	793	210	106	457	73	172	534	133	85	256	283
Adj No. of Lanes	2	2	1	2	3	1	1	2	0	1	2	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	737	1114	498	162	751	234	202	1215	301	108	671	600
Arrive On Green	0.21	0.31	0.31	0.05	0.15	0.15	0.11	0.43	0.43	0.06	0.38	0.38
Sat Flow, veh/h	3442	3539	1583	3442	5085	1583	1774	2812	697	1774	1770	1583
Grp Volume(v), veh/h	640	793	210	106	457	73	172	335	332	85	256	283
Grp Sat Flow(s),veh/h/ln	1721	1770	1583	1721	1695	1583	1774	1770	1740	1774	1770	1583
Q Serve(g_s), s	22.2	24.5	13.0	3.7	10.4	5.1	11.8	16.4	16.6	5.9	13.0	16.7
Cycle Q Clear(g_c), s	22.2	24.5	13.0	3.7	10.4	5.1	11.8	16.4	16.6	5.9	13.0	16.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.40	1.00		1.00
Lane Grp Cap(c), veh/h	737	1114	498	162	751	234	202	765	752	108	671	600
V/C Ratio(X)	0.87	0.71	0.42	0.65	0.61	0.31	0.85	0.44	0.44	0.79	0.38	0.47
Avail Cap(c_a), veh/h	1154	1529	684	264	883	275	380	765	752	222	671	600
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.0	37.5	33.5	58.0	49.4	47.1	53.8	24.6	24.7	57.4	27.9	29.1
Incr Delay (d2), s/veh	4.5	1.0	0.6	4.4	0.9	0.8	9.6	1.8	1.9	12.0	1.6	2.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.0	12.2	5.7	1.9	4.9	2.3	6.3	8.4	8.3	3.2	6.6	7.8
LnGrp Delay(d),s/veh	51.5	38.4	34.1	62.4	50.3	47.9	63.5	26.5	26.5	69.4	29.6	31.7
LnGrp LOS	D	D	C	E	D	D	E	C	C	E	C	C
Approach Vol, veh/h		1643			636			839			624	
Approach Delay, s/veh		43.0			52.0			34.1			36.0	
Approach LOS		D			D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	58.0	10.3	43.5	18.6	51.4	31.0	22.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	15.5	53.5	9.5	53.5	26.5	42.5	41.5	21.5
Max Q Clear Time (g_c+I1), s	7.9	18.6	5.7	26.5	13.8	18.7	24.2	12.4
Green Ext Time (p_c), s	0.1	9.6	0.1	11.5	0.4	8.5	2.3	5.9

Intersection Summary	
HCM 2010 Ctrl Delay	41.4
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	78	314	138	76	171	169	163	1020	456	132	305	32
Future Volume (veh/h)	78	314	138	76	171	169	163	1020	456	132	305	32
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	84	338	148	82	184	182	175	1097	490	142	328	34
Adj No. of Lanes	1	2	0	1	1	1	1	2	1	1	2	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	107	498	214	105	382	325	212	1577	705	174	1501	672
Arrive On Green	0.06	0.21	0.21	0.06	0.21	0.21	0.12	0.45	0.45	0.10	0.42	0.42
Sat Flow, veh/h	1774	2412	1037	1774	1863	1583	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	84	246	240	82	184	182	175	1097	490	142	328	34
Grp Sat Flow(s),veh/h/ln	1774	1770	1680	1774	1863	1583	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	4.4	12.1	12.5	4.3	8.2	9.8	9.1	23.5	23.5	7.4	5.6	1.2
Cycle Q Clear(g_c), s	4.4	12.1	12.5	4.3	8.2	9.8	9.1	23.5	23.5	7.4	5.6	1.2
Prop In Lane	1.00		0.62	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	107	366	347	105	382	325	212	1577	705	174	1501	672
V/C Ratio(X)	0.78	0.67	0.69	0.78	0.48	0.56	0.82	0.70	0.69	0.81	0.22	0.05
Avail Cap(c_a), veh/h	141	747	709	141	787	669	389	1577	705	235	1501	672
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.8	34.6	34.7	43.8	33.1	33.7	40.6	21.0	21.0	41.8	17.3	16.0
Incr Delay (d2), s/veh	18.6	2.2	2.5	17.9	0.9	1.5	7.9	2.6	5.6	14.7	0.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	6.1	6.0	2.6	4.3	4.4	4.9	12.0	11.4	4.3	2.8	0.5
LnGrp Delay(d),s/veh	62.4	36.7	37.2	61.7	34.1	35.2	48.5	23.6	26.6	56.5	17.6	16.2
LnGrp LOS	E	D	D	E	C	D	D	C	C	E	B	B
Approach Vol, veh/h		570			448			1762			504	
Approach Delay, s/veh		40.7			39.6			26.9			28.5	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.8	46.6	10.1	24.0	15.8	44.6	10.2	23.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	12.5	42.1	7.5	39.9	20.7	33.9	7.5	39.9
Max Q Clear Time (g_c+I1), s	9.4	25.5	6.3	14.5	11.1	7.6	6.4	11.8
Green Ext Time (p_c), s	0.1	10.9	0.0	5.0	0.3	14.7	0.0	5.1

Intersection Summary	
HCM 2010 Ctrl Delay	31.3
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	103	0	83	0	0	4	71	988	4	7	516	45
Future Volume (veh/h)	103	0	83	0	0	4	71	988	4	7	516	45
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	107	0	86	0	0	4	74	1029	4	7	538	47
Adj No. of Lanes	1	1	1	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	167	175	149	0	0	8	100	2240	9	16	1886	164
Arrive On Green	0.09	0.00	0.09	0.00	0.00	0.01	0.06	0.62	0.62	0.01	0.57	0.57
Sat Flow, veh/h	1774	1863	1583	0	0	1583	1774	3616	14	1774	3295	287
Grp Volume(v), veh/h	107	0	86	0	0	4	74	504	529	7	288	297
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	0	0	1583	1774	1770	1860	1774	1770	1812
Q Serve(g_s), s	3.8	0.0	3.4	0.0	0.0	0.2	2.7	10.0	10.0	0.3	5.5	5.5
Cycle Q Clear(g_c), s	3.8	0.0	3.4	0.0	0.0	0.2	2.7	10.0	10.0	0.3	5.5	5.5
Prop In Lane	1.00		1.00	0.00		1.00	1.00		0.01	1.00		0.16
Lane Grp Cap(c), veh/h	167	175	149	0	0	8	100	1096	1153	16	1013	1037
V/C Ratio(X)	0.64	0.00	0.58	0.00	0.00	0.47	0.74	0.46	0.46	0.43	0.28	0.29
Avail Cap(c_a), veh/h	831	873	742	0	0	120	263	1096	1153	134	1013	1037
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.9	0.0	28.7	0.0	0.0	32.8	30.8	6.7	6.7	32.6	7.2	7.2
Incr Delay (d2), s/veh	4.1	0.0	3.5	0.0	0.0	35.6	10.3	1.4	1.3	17.2	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	0.0	1.6	0.0	0.0	0.2	1.6	5.2	5.4	0.2	2.8	2.9
LnGrp Delay(d),s/veh	33.0	0.0	32.2	0.0	0.0	68.4	41.1	8.1	8.0	49.8	7.9	7.9
LnGrp LOS	C		C			E	D	A	A	D	A	A
Approach Vol, veh/h		193			4			1107			592	
Approach Delay, s/veh		32.7			68.4			10.3			8.4	
Approach LOS		C			E			B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.1	45.5		10.7	8.2	42.4		4.9
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5
Max Green Setting (Gmax), s	5.0	41.0		31.0	9.8	36.2		5.0
Max Q Clear Time (g_c+I1), s	2.3	12.0		5.8	4.7	7.5		2.2
Green Ext Time (p_c), s	0.0	13.0		0.6	0.1	12.9		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	12.1
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	4	171	15	3	6	185	893	20	1	371	8
Future Volume (veh/h)	21	4	171	15	3	6	185	893	20	1	371	8
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	22	4	178	16	3	6	193	930	21	1	386	8
Adj No. of Lanes	1	1	1	1	2	0	1	2	0	1	2	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	44	267	227	34	243	218	240	2057	46	3	1586	33
Arrive On Green	0.02	0.14	0.14	0.02	0.14	0.14	0.14	0.58	0.58	0.00	0.45	0.45
Sat Flow, veh/h	1774	1863	1583	1774	1770	1583	1774	3538	80	1774	3546	73
Grp Volume(v), veh/h	22	4	178	16	3	6	193	465	486	1	192	202
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1770	1583	1774	1770	1849	1774	1770	1850
Q Serve(g_s), s	0.9	0.1	7.7	0.6	0.1	0.2	7.4	10.5	10.5	0.0	4.8	4.8
Cycle Q Clear(g_c), s	0.9	0.1	7.7	0.6	0.1	0.2	7.4	10.5	10.5	0.0	4.8	4.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.04	1.00		0.04
Lane Grp Cap(c), veh/h	44	267	227	34	243	218	240	1029	1074	3	792	827
V/C Ratio(X)	0.50	0.02	0.79	0.47	0.01	0.03	0.80	0.45	0.45	0.40	0.24	0.24
Avail Cap(c_a), veh/h	138	819	696	126	765	685	440	1029	1074	126	792	827
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.0	26.0	29.2	34.2	26.3	26.3	29.6	8.4	8.4	35.2	12.1	12.1
Incr Delay (d2), s/veh	8.5	0.0	5.9	9.9	0.0	0.1	6.2	1.4	1.4	79.0	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.1	3.7	0.4	0.1	0.1	4.1	5.4	5.7	0.1	2.5	2.6
LnGrp Delay(d),s/veh	42.5	26.0	35.1	44.1	26.3	26.4	35.8	9.8	9.8	114.2	12.8	12.8
LnGrp LOS	D	C	D	D	C	C	D	A	A	F	B	B
Approach Vol, veh/h		204			25			1144			395	
Approach Delay, s/veh		35.7			37.7			14.2			13.1	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	4.6	45.5	5.8	14.6	14.0	36.1	6.3	14.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	41.0	5.0	31.0	17.5	28.5	5.5	30.5
Max Q Clear Time (g_c+I1), s	2.0	12.5	2.6	9.7	9.4	6.8	2.9	2.2
Green Ext Time (p_c), s	0.0	10.2	0.0	0.6	0.3	9.1	0.0	0.6

Intersection Summary	
HCM 2010 Ctrl Delay	16.8
HCM 2010 LOS	B

FUTURE YEAR 2035 WITHOUT PROJECT CONDITIONS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	51	14	732	78	258	10	309	253	652	945	22
Future Volume (veh/h)	15	51	14	732	78	258	10	309	253	652	945	22
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	16	55	15	796	85	280	11	336	275	709	1027	24
Adj No. of Lanes	1	3	0	1	3	1	1	3	2	2	3	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	31	211	53	574	1822	567	23	1479	811	565	2260	53
Arrive On Green	0.02	0.05	0.05	0.32	0.36	0.36	0.01	0.29	0.29	0.16	0.44	0.44
Sat Flow, veh/h	1774	4049	1023	1774	5085	1583	1774	5085	2787	3442	5112	119
Grp Volume(v), veh/h	16	45	25	796	85	280	11	336	275	709	681	370
Grp Sat Flow(s),veh/h/ln	1774	1695	1682	1774	1695	1583	1774	1695	1393	1721	1695	1842
Q Serve(g_s), s	1.0	1.4	1.5	34.5	1.2	14.7	0.7	5.3	8.3	17.5	14.9	15.0
Cycle Q Clear(g_c), s	1.0	1.4	1.5	34.5	1.2	14.7	0.7	5.3	8.3	17.5	14.9	15.0
Prop In Lane	1.00		0.61	1.00		1.00	1.00		1.00	1.00		0.06
Lane Grp Cap(c), veh/h	31	177	88	574	1822	567	23	1479	811	565	1499	814
V/C Ratio(X)	0.51	0.26	0.28	1.39	0.05	0.49	0.48	0.23	0.34	1.25	0.45	0.45
Avail Cap(c_a), veh/h	92	1241	616	574	3245	1010	83	1479	811	565	1499	814
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.9	48.5	48.6	36.0	22.3	26.7	52.2	28.7	29.7	44.5	20.7	20.8
Incr Delay (d2), s/veh	12.2	0.8	1.7	184.2	0.0	0.7	14.4	0.4	1.1	128.4	1.0	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.7	0.7	46.1	0.5	6.5	0.4	2.5	3.3	18.3	7.2	8.0
LnGrp Delay(d),s/veh	64.1	49.3	50.3	220.2	22.3	27.3	66.6	29.0	30.9	173.0	21.7	22.6
LnGrp LOS	E	D	D	F	C	C	E	C	C	F	C	C
Approach Vol, veh/h		86			1161			622			1760	
Approach Delay, s/veh		52.3			159.2			30.5			82.8	
Approach LOS		D			F			C			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.0	35.5	39.0	10.1	5.9	51.6	6.4	42.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	17.5	31.0	34.5	39.0	5.0	43.5	5.5	68.0
Max Q Clear Time (g_c+I1), s	19.5	10.3	36.5	3.5	2.7	17.0	3.0	16.7
Green Ext Time (p_c), s	0.0	11.0	0.0	2.1	0.0	12.5	0.0	2.1

Intersection Summary	
HCM 2010 Ctrl Delay	97.6
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	77	745	87	666	1075	282	36	223	297	282	593	355
Future Volume (veh/h)	77	745	87	666	1075	282	36	223	297	282	593	355
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	87	837	98	748	1208	317	40	251	334	317	666	399
Adj No. of Lanes	2	4	0	2	3	1	2	2	2	2	2	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	132	1271	147	806	2095	652	99	1097	864	367	827	495
Arrive On Green	0.04	0.22	0.22	0.23	0.41	0.41	0.03	0.31	0.31	0.11	0.39	0.39
Sat Flow, veh/h	3442	5871	678	3442	5085	1583	3442	3539	2787	3442	2131	1276
Grp Volume(v), veh/h	87	683	252	748	1208	317	40	251	334	317	553	512
Grp Sat Flow(s),veh/h/ln	1721	1602	1743	1721	1695	1583	1721	1770	1393	1721	1770	1638
Q Serve(g_s), s	3.4	17.6	17.9	28.8	24.8	19.9	1.5	7.1	12.7	12.3	37.7	37.7
Cycle Q Clear(g_c), s	3.4	17.6	17.9	28.8	24.8	19.9	1.5	7.1	12.7	12.3	37.7	37.7
Prop In Lane	1.00		0.39	1.00		1.00	1.00		1.00	1.00		0.78
Lane Grp Cap(c), veh/h	132	1040	377	806	2095	652	99	1097	864	367	686	635
V/C Ratio(X)	0.66	0.66	0.67	0.93	0.58	0.49	0.40	0.23	0.39	0.86	0.81	0.81
Avail Cap(c_a), veh/h	188	1100	399	851	2144	667	127	1097	864	394	686	635
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	64.2	48.5	48.6	50.8	30.7	29.3	64.6	34.7	36.6	59.5	36.9	36.9
Incr Delay (d2), s/veh	5.4	1.3	4.0	15.8	0.4	0.6	2.6	0.5	1.3	17.0	9.8	10.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	7.9	9.0	15.5	11.7	8.8	0.8	3.6	5.0	6.7	20.3	18.9
LnGrp Delay(d),s/veh	69.7	49.8	52.6	66.5	31.1	29.8	67.3	35.2	37.9	76.6	46.7	47.4
LnGrp LOS	E	D	D	E	C	C	E	D	D	E	D	D
Approach Vol, veh/h		1022			2273			625			1382	
Approach Delay, s/veh		52.2			42.6			38.7			53.8	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.9	46.5	36.2	33.8	8.4	57.0	9.7	60.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	15.5	42.0	33.5	31.0	5.0	52.5	7.4	57.1
Max Q Clear Time (g_c+I1), s	14.3	14.7	30.8	19.9	3.5	39.7	5.4	26.8
Green Ext Time (p_c), s	0.2	12.6	0.9	9.4	0.0	8.0	0.0	21.2

Intersection Summary	
HCM 2010 Ctrl Delay	46.9
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	77	482	77	310	514	176	82	209	132	133	806	87
Future Volume (veh/h)	77	482	77	310	514	176	82	209	132	133	806	87
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	78	487	78	313	519	178	83	211	133	134	814	88
Adj No. of Lanes	2	3	1	2	3	1	1	2	1	1	2	1
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	163	1027	320	405	1384	431	107	1370	613	168	1491	667
Arrive On Green	0.05	0.20	0.20	0.12	0.27	0.27	0.06	0.39	0.39	0.09	0.42	0.42
Sat Flow, veh/h	3442	5085	1583	3442	5085	1583	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	78	487	78	313	519	178	83	211	133	134	814	88
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1695	1583	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	2.0	7.7	3.7	8.0	7.5	8.4	4.2	3.5	5.1	6.7	15.7	3.1
Cycle Q Clear(g_c), s	2.0	7.7	3.7	8.0	7.5	8.4	4.2	3.5	5.1	6.7	15.7	3.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	163	1027	320	405	1384	431	107	1370	613	168	1491	667
V/C Ratio(X)	0.48	0.47	0.24	0.77	0.37	0.41	0.77	0.15	0.22	0.80	0.55	0.13
Avail Cap(c_a), veh/h	251	1913	596	664	2524	786	239	1370	613	325	1491	667
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.1	31.9	30.4	38.8	26.7	27.1	42.0	18.1	18.6	40.2	19.7	16.1
Incr Delay (d2), s/veh	2.2	0.3	0.4	3.2	0.2	0.6	11.2	0.2	0.8	8.3	1.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	3.6	1.7	4.0	3.5	3.7	2.4	1.8	2.4	3.7	7.9	1.4
LnGrp Delay(d),s/veh	44.2	32.3	30.8	42.0	26.9	27.7	53.2	18.3	19.4	48.5	21.2	16.5
LnGrp LOS	D	C	C	D	C	C	D	B	B	D	C	B
Approach Vol, veh/h		643			1010			427			1036	
Approach Delay, s/veh		33.5			31.7			25.4			24.3	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.1	39.6	15.2	22.8	10.0	42.7	8.8	29.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	16.6	33.8	17.5	34.1	12.2	38.2	6.6	45.0
Max Q Clear Time (g_c+I1), s	8.7	7.1	10.0	9.7	6.2	17.7	4.0	10.4
Green Ext Time (p_c), s	0.2	9.0	0.7	8.7	0.1	8.1	0.0	9.6

Intersection Summary	
HCM 2010 Ctrl Delay	28.8
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	165	104	104	10	71	187	99	1248	10	264	2366	151
Future Volume (veh/h)	165	104	104	10	71	187	99	1248	10	264	2366	151
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	179	113	113	11	77	203	108	1357	11	287	2572	164
Adj No. of Lanes	1	3	0	1	3	1	1	3	0	2	3	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	209	886	414	23	796	248	109	2476	20	353	2528	159
Arrive On Green	0.12	0.26	0.26	0.01	0.16	0.16	0.06	0.48	0.48	0.10	0.52	0.52
Sat Flow, veh/h	1774	3390	1583	1774	5085	1583	1774	5203	42	3442	4892	307
Grp Volume(v), veh/h	179	113	113	11	77	203	108	884	484	287	1770	966
Grp Sat Flow(s),veh/h/ln	1774	1695	1583	1774	1695	1583	1774	1695	1855	1721	1695	1809
Q Serve(g_s), s	12.1	3.1	6.9	0.8	1.6	15.1	7.4	22.6	22.6	10.0	63.1	63.1
Cycle Q Clear(g_c), s	12.1	3.1	6.9	0.8	1.6	15.1	7.4	22.6	22.6	10.0	63.1	63.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.02	1.00		0.17
Lane Grp Cap(c), veh/h	209	886	414	23	796	248	109	1613	883	353	1752	935
V/C Ratio(X)	0.86	0.13	0.27	0.49	0.10	0.82	0.99	0.55	0.55	0.81	1.01	1.03
Avail Cap(c_a), veh/h	344	1289	602	73	1154	359	109	1613	883	522	1752	935
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.8	34.4	35.9	59.9	44.1	49.8	57.3	22.7	22.7	53.6	29.5	29.5
Incr Delay (d2), s/veh	10.9	0.1	0.4	15.3	0.1	9.4	83.2	1.3	2.4	6.1	24.0	38.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.5	1.5	3.1	0.5	0.7	7.2	6.1	10.9	12.2	5.0	35.3	41.4
LnGrp Delay(d),s/veh	63.7	34.5	36.2	75.1	44.2	59.2	140.4	24.0	25.1	59.8	53.5	67.8
LnGrp LOS	E	C	D	E	D	E	F	C	C	E	F	F
Approach Vol, veh/h		405			291			1476			3023	
Approach Delay, s/veh		47.9			55.8			32.9			58.7	
Approach LOS		D			E			C			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.0	62.6	6.1	36.4	12.0	67.6	18.9	23.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	18.5	52.1	5.0	46.4	7.5	63.1	23.7	27.7
Max Q Clear Time (g_c+I1), s	12.0	24.6	2.8	8.9	9.4	65.1	14.1	17.1
Green Ext Time (p_c), s	0.5	26.8	0.0	2.8	0.0	0.0	0.3	2.0

Intersection Summary	
HCM 2010 Ctrl Delay	50.3
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	144	362	71	478	55	280	125	41	44	484	423
Future Volume (veh/h)	70	144	362	71	478	55	280	125	41	44	484	423
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	74	153	385	76	509	59	298	133	44	47	515	450
Adj No. of Lanes	2	3	1	1	3	1	2	2	1	1	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	147	1385	431	99	1451	452	352	1630	729	64	1396	624
Arrive On Green	0.04	0.27	0.27	0.06	0.29	0.29	0.10	0.46	0.46	0.04	0.39	0.39
Sat Flow, veh/h	3442	5085	1583	1774	5085	1583	3442	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	74	153	385	76	509	59	298	133	44	47	515	450
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1774	1695	1583	1721	1770	1583	1774	1770	1583
Q Serve(g_s), s	2.2	2.3	24.0	4.3	8.2	2.8	8.7	2.2	1.6	2.7	10.6	24.7
Cycle Q Clear(g_c), s	2.2	2.3	24.0	4.3	8.2	2.8	8.7	2.2	1.6	2.7	10.6	24.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	147	1385	431	99	1451	452	352	1630	729	64	1396	624
V/C Ratio(X)	0.50	0.11	0.89	0.77	0.35	0.13	0.85	0.08	0.06	0.74	0.37	0.72
Avail Cap(c_a), veh/h	318	1461	455	371	2055	640	352	1630	729	285	1396	624
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.1	28.0	35.9	47.8	29.1	27.2	45.3	15.5	15.4	49.0	22.0	26.3
Incr Delay (d2), s/veh	2.6	0.0	18.9	11.7	0.1	0.1	17.2	0.1	0.2	15.2	0.8	7.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	1.1	12.7	2.5	3.8	1.3	5.0	1.1	0.7	1.6	5.3	12.0
LnGrp Delay(d),s/veh	50.7	28.1	54.9	59.5	29.3	27.4	62.5	15.6	15.5	64.2	22.8	33.4
LnGrp LOS	D	C	D	E	C	C	E	B	B	E	C	C
Approach Vol, veh/h		612			644			475			1012	
Approach Delay, s/veh		47.7			32.7			45.0			29.4	
Approach LOS		D			C			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.2	51.8	10.2	32.5	15.0	45.0	8.9	33.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	16.5	34.5	21.5	29.5	10.5	40.5	9.5	41.5
Max Q Clear Time (g_c+I1), s	4.7	4.2	6.3	26.0	10.7	26.7	4.2	10.2
Green Ext Time (p_c), s	0.1	7.1	0.1	2.0	0.0	5.3	0.1	7.1

Intersection Summary	
HCM 2010 Ctrl Delay	37.0
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	166	146	156	425	386	24	442	160	69	86	298	358
Future Volume (veh/h)	166	146	156	425	386	24	442	160	69	86	298	358
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	166	146	156	425	386	24	442	160	69	86	298	358
Adj No. of Lanes	1	2	0	1	2	0	1	2	1	1	2	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	193	234	210	453	945	59	470	1470	658	108	374	334
Arrive On Green	0.11	0.13	0.13	0.26	0.28	0.28	0.27	0.42	0.42	0.06	0.21	0.21
Sat Flow, veh/h	1774	1770	1583	1774	3386	210	1774	3539	1583	1774	1770	1583
Grp Volume(v), veh/h	166	146	156	425	201	209	442	160	69	86	298	358
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1826	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	12.2	10.3	12.6	31.1	12.3	12.4	32.3	3.7	3.5	6.3	21.2	28.0
Cycle Q Clear(g_c), s	12.2	10.3	12.6	31.1	12.3	12.4	32.3	3.7	3.5	6.3	21.2	28.0
Prop In Lane	1.00		1.00	1.00		0.11	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	193	234	210	453	494	509	470	1470	658	108	374	334
V/C Ratio(X)	0.86	0.62	0.74	0.94	0.41	0.41	0.94	0.11	0.10	0.80	0.80	1.07
Avail Cap(c_a), veh/h	314	320	287	528	534	551	542	1470	658	198	374	334
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.1	54.4	55.4	48.3	38.9	38.9	47.7	23.7	23.7	61.5	49.6	52.3
Incr Delay (d2), s/veh	12.3	2.7	6.7	22.8	0.5	0.5	23.0	0.1	0.3	12.4	16.1	69.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.7	5.2	5.9	18.1	6.1	6.3	18.8	1.8	1.6	3.5	12.0	18.6
LnGrp Delay(d),s/veh	70.4	57.1	62.1	71.1	39.4	39.4	70.7	23.9	24.0	73.8	65.7	121.6
LnGrp LOS	E	E	E	E	D	D	E	C	C	E	E	F
Approach Vol, veh/h		468			835			671			742	
Approach Delay, s/veh		63.5			55.5			54.7			93.6	
Approach LOS		E			E			D			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.6	59.6	38.4	22.1	39.6	32.5	18.9	41.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	14.8	53.7	39.5	24.0	40.5	28.0	23.5	40.0
Max Q Clear Time (g_c+I1), s	8.3	5.7	33.1	14.6	34.3	30.0	14.2	14.4
Green Ext Time (p_c), s	0.1	6.7	0.8	3.0	0.8	0.0	0.3	4.6

Intersection Summary	
HCM 2010 Ctrl Delay	67.1
HCM 2010 LOS	E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	987	190	627	940	143	473
Future Volume (vph)	987	190	627	940	143	473
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5	4.5	4.5	4.5
Lane Util. Factor	0.91		1.00	0.91	1.00	0.88
Frt	0.98		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	4962		1770	5085	1770	2787
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	4962		1770	5085	1770	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1039	200	660	989	151	498
RTOR Reduction (vph)	20	0	0	0	0	372
Lane Group Flow (vph)	1219	0	660	989	151	126
Turn Type	NA		Prot	NA	Perm	Perm
Protected Phases	4		3	8		
Permitted Phases					2	2
Actuated Green, G (s)	35.6		53.2	93.3	34.6	34.6
Effective Green, g (s)	35.6		53.2	93.3	34.6	34.6
Actuated g/C Ratio	0.26		0.39	0.68	0.25	0.25
Clearance Time (s)	4.5		4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1290		687	3465	447	704
v/s Ratio Prot	c0.25		c0.37	0.19		
v/s Ratio Perm					c0.09	0.05
v/c Ratio	0.94		0.96	0.29	0.34	0.18
Uniform Delay, d1	49.7		40.8	8.6	41.8	40.0
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	13.9		24.9	0.0	2.0	0.6
Delay (s)	63.6		65.7	8.7	43.8	40.6
Level of Service	E		E	A	D	D
Approach Delay (s)	63.6			31.5	41.3	
Approach LOS	E			C	D	

Intersection Summary			
HCM 2000 Control Delay	44.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	136.9	Sum of lost time (s)	13.5
Intersection Capacity Utilization	77.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	759	302	332	627	209	154	366	136	290	918	49
Future Volume (veh/h)	26	759	302	332	627	209	154	366	136	290	918	49
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	29	834	332	365	689	230	169	402	149	319	1009	54
Adj No. of Lanes	1	3	0	1	2	1	2	3	1	1	3	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	43	973	385	328	1529	684	220	1272	396	289	1726	92
Arrive On Green	0.02	0.27	0.27	0.18	0.43	0.43	0.06	0.25	0.25	0.16	0.35	0.35
Sat Flow, veh/h	1774	3583	1419	1774	3539	1583	3442	5085	1583	1774	4942	264
Grp Volume(v), veh/h	29	789	377	365	689	230	169	402	149	319	692	371
Grp Sat Flow(s),veh/h/ln	1774	1695	1612	1774	1770	1583	1721	1695	1583	1774	1695	1816
Q Serve(g_s), s	2.2	30.5	30.7	25.5	18.9	13.3	6.7	8.9	10.7	22.5	23.0	23.1
Cycle Q Clear(g_c), s	2.2	30.5	30.7	25.5	18.9	13.3	6.7	8.9	10.7	22.5	23.0	23.1
Prop In Lane	1.00		0.88	1.00		1.00	1.00		1.00	1.00		0.15
Lane Grp Cap(c), veh/h	43	921	438	328	1529	684	220	1272	396	289	1184	634
V/C Ratio(X)	0.67	0.86	0.86	1.11	0.45	0.34	0.77	0.32	0.38	1.10	0.58	0.59
Avail Cap(c_a), veh/h	84	971	462	328	1529	684	307	1272	396	289	1184	634
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.8	47.7	47.8	56.2	27.6	26.0	63.6	42.1	42.8	57.7	36.7	36.7
Incr Delay (d2), s/veh	16.6	7.4	14.7	83.8	0.2	0.3	7.5	0.7	2.7	83.3	2.1	3.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	15.2	15.4	20.1	9.3	5.9	3.4	4.2	5.0	17.7	11.1	12.2
LnGrp Delay(d),s/veh	83.4	55.1	62.5	140.0	27.8	26.3	71.0	42.8	45.5	141.0	38.8	40.7
LnGrp LOS	F	E	E	F	C	C	E	D	D	F	D	D
Approach Vol, veh/h		1195			1284			720			1382	
Approach Delay, s/veh		58.1			59.5			50.0			62.9	
Approach LOS		E			E			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	27.0	39.0	30.0	42.0	13.3	52.7	7.9	64.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	22.5	34.5	25.5	39.5	12.3	44.7	6.5	58.5
Max Q Clear Time (g_c+I1), s	24.5	12.7	27.5	32.7	8.7	25.1	4.2	20.9
Green Ext Time (p_c), s	0.0	11.2	0.0	4.8	0.2	10.6	0.0	20.3

Intersection Summary	
HCM 2010 Ctrl Delay	58.7
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	679	575	121	297	870	201	249	936	148	187	1767	1076
Future Volume (veh/h)	679	575	121	297	870	201	249	936	148	187	1767	1076
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	700	593	125	306	897	207	257	965	153	193	1822	1109
Adj No. of Lanes	2	3	1	2	3	0	2	3	1	2	3	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	435	1461	455	360	1098	252	200	2108	656	242	2170	676
Arrive On Green	0.13	0.29	0.29	0.10	0.27	0.27	0.06	0.41	0.41	0.07	0.43	0.43
Sat Flow, veh/h	3442	5085	1583	3442	4135	950	3442	5085	1583	3442	5085	1583
Grp Volume(v), veh/h	700	593	125	306	735	369	257	965	153	193	1822	1109
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1695	1695	1721	1695	1583	1721	1695	1583
Q Serve(g_s), s	18.5	13.8	8.9	12.8	29.7	29.9	8.5	20.1	9.2	8.1	46.8	62.4
Cycle Q Clear(g_c), s	18.5	13.8	8.9	12.8	29.7	29.9	8.5	20.1	9.2	8.1	46.8	62.4
Prop In Lane	1.00		1.00	1.00		0.56	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	435	1461	455	360	900	450	200	2108	656	242	2170	676
V/C Ratio(X)	1.61	0.41	0.27	0.85	0.82	0.82	1.28	0.46	0.23	0.80	0.84	1.64
Avail Cap(c_a), veh/h	435	1461	455	480	988	494	200	2108	656	334	2170	676
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	63.9	42.0	40.3	64.3	50.4	50.4	68.9	30.9	27.8	66.9	37.4	41.9
Incr Delay (d2), s/veh	284.0	0.2	0.3	10.5	5.0	9.8	160.5	0.7	0.8	8.9	4.1	295.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	25.9	6.4	3.9	6.6	14.5	15.3	8.5	9.5	4.2	4.2	22.8	82.6
LnGrp Delay(d),s/veh	347.9	42.2	40.6	74.9	55.4	60.3	229.4	31.7	28.6	75.9	41.6	337.2
LnGrp LOS	F	D	D	E	E	E	F	C	C	E	D	F
Approach Vol, veh/h		1418			1410			1375			3124	
Approach Delay, s/veh		193.0			60.9			68.3			148.6	
Approach LOS		F			E			E			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.8	65.1	19.8	46.5	13.0	66.9	23.0	43.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	14.2	56.7	20.4	40.7	8.5	62.4	18.5	42.6
Max Q Clear Time (g_c+I1), s	10.1	22.1	14.8	15.8	10.5	64.4	20.5	31.9
Green Ext Time (p_c), s	0.2	32.5	0.5	14.1	0.0	0.0	0.0	6.9

Intersection Summary	
HCM 2010 Ctrl Delay	125.2
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	126	819	82	514	1034	214	93	115	139	568	557	209
Future Volume (veh/h)	126	819	82	514	1034	214	93	115	139	568	557	209
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	137	890	89	559	1124	233	101	125	151	617	605	227
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	2	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	143	769	77	384	1089	225	89	431	385	631	487	183
Arrive On Green	0.08	0.24	0.24	0.22	0.37	0.37	0.05	0.24	0.24	0.18	0.38	0.38
Sat Flow, veh/h	1774	3250	325	1774	2923	603	1774	1770	1583	3442	1292	485
Grp Volume(v), veh/h	137	485	494	559	678	679	101	125	151	617	0	832
Grp Sat Flow(s),veh/h/ln	1774	1770	1805	1774	1770	1756	1774	1770	1583	1721	0	1777
Q Serve(g_s), s	11.5	35.5	35.5	32.5	55.9	55.9	7.5	8.6	12.0	26.8	0.0	56.5
Cycle Q Clear(g_c), s	11.5	35.5	35.5	32.5	55.9	55.9	7.5	8.6	12.0	26.8	0.0	56.5
Prop In Lane	1.00		0.18	1.00		0.34	1.00		1.00	1.00		0.27
Lane Grp Cap(c), veh/h	143	419	427	384	659	655	89	431	385	631	0	669
V/C Ratio(X)	0.96	1.16	1.16	1.45	1.03	1.04	1.14	0.29	0.39	0.98	0.00	1.24
Avail Cap(c_a), veh/h	143	419	427	384	659	655	89	431	385	631	0	669
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	68.7	57.3	57.3	58.8	47.0	47.1	71.3	46.2	47.5	60.9	0.0	46.8
Incr Delay (d2), s/veh	62.2	94.4	94.0	218.5	42.4	45.2	137.8	1.7	3.0	30.2	0.0	121.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.1	28.3	28.8	39.2	35.1	35.3	7.1	4.4	5.6	15.4	0.0	50.3
LnGrp Delay(d),s/veh	130.8	151.6	151.3	277.2	89.5	92.3	209.1	47.9	50.4	91.1	0.0	168.4
LnGrp LOS	F	F	F	F	F	F	F	D	D	F		F
Approach Vol, veh/h		1116			1916			377			1449	
Approach Delay, s/veh		148.9			145.2			92.1			135.5	
Approach LOS		F			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	32.0	41.0	37.0	40.0	12.0	61.0	16.6	60.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	27.5	36.5	32.5	35.5	7.5	56.5	12.1	55.9
Max Q Clear Time (g_c+I1), s	28.8	14.0	34.5	37.5	9.5	58.5	13.5	57.9
Green Ext Time (p_c), s	0.0	8.8	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	139.1
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1117	396	277	1006	0	0	0	0	159	0	785
Future Volume (vph)	0	1117	396	277	1006	0	0	0	0	159	0	785
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5					4.5	4.5	4.5
Lane Util. Factor		0.95	1.00	0.97	0.95					0.95	0.91	0.95
Frt		1.00	0.85	1.00	1.00					1.00	0.86	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	1.00	1.00
Satd. Flow (prot)		3539	1583	3433	3539					1681	1448	1504
Flt Permitted		1.00	1.00	0.95	1.00					0.95	1.00	1.00
Satd. Flow (perm)		3539	1583	3433	3539					1681	1448	1504
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	1152	408	286	1037	0	0	0	0	164	0	809
RTOR Reduction (vph)	0	0	117	0	0	0	0	0	0	0	61	61
Lane Group Flow (vph)	0	1152	291	286	1037	0	0	0	0	148	351	352
Turn Type		NA	Perm	Prot	NA					Prot	NA	Perm
Protected Phases		4		3	8					1	6	
Permitted Phases			4									6
Actuated Green, G (s)		38.0	38.0	11.7	54.2					34.6	34.6	34.6
Effective Green, g (s)		38.0	38.0	11.7	54.2					34.6	34.6	34.6
Actuated g/C Ratio		0.39	0.39	0.12	0.55					0.35	0.35	0.35
Clearance Time (s)		4.5	4.5	4.5	4.5					4.5	4.5	4.5
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Lane Grp Cap (vph)		1375	615	410	1961					594	512	532
v/s Ratio Prot		c0.33		c0.08	0.29					0.09	c0.24	
v/s Ratio Perm			0.18									0.23
v/c Ratio		0.84	0.47	0.70	0.53					0.25	0.68	0.66
Uniform Delay, d1		27.1	22.4	41.4	13.7					22.4	26.9	26.7
Progression Factor		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Incremental Delay, d2		4.6	0.6	5.1	0.3					0.2	3.8	6.3
Delay (s)		31.7	23.0	46.5	14.0					22.6	30.7	33.0
Level of Service		C	C	D	B					C	C	C
Approach Delay (s)		29.4			21.0			0.0			30.5	
Approach LOS		C			C			A			C	

Intersection Summary			
HCM 2000 Control Delay	26.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	97.8	Sum of lost time (s)	13.5
Intersection Capacity Utilization	67.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	1341	33	183	1743	269	38	66	49	462	247	154
Future Volume (veh/h)	35	1341	33	183	1743	269	38	66	49	462	247	154
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	37	1427	35	195	1854	286	40	70	52	491	263	164
Adj No. of Lanes	1	3	0	1	3	0	1	2	1	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	47	1478	36	201	1675	256	52	850	380	420	951	574
Arrive On Green	0.03	0.29	0.29	0.11	0.38	0.38	0.03	0.24	0.24	0.24	0.45	0.45
Sat Flow, veh/h	1774	5106	125	1774	4453	680	1774	3539	1583	1774	2124	1282
Grp Volume(v), veh/h	37	948	514	195	1407	733	40	70	52	491	218	209
Grp Sat Flow(s),veh/h/ln	1774	1695	1841	1774	1695	1743	1774	1770	1583	1774	1770	1636
Q Serve(g_s), s	3.1	41.3	41.3	16.4	56.4	56.4	3.4	2.3	3.9	35.5	11.6	12.1
Cycle Q Clear(g_c), s	3.1	41.3	41.3	16.4	56.4	56.4	3.4	2.3	3.9	35.5	11.6	12.1
Prop In Lane	1.00		0.07	1.00		0.39	1.00		1.00	1.00		0.78
Lane Grp Cap(c), veh/h	47	981	533	201	1275	655	52	850	380	420	793	733
V/C Ratio(X)	0.78	0.97	0.97	0.97	1.10	1.12	0.78	0.08	0.14	1.17	0.27	0.29
Avail Cap(c_a), veh/h	59	984	534	201	1275	655	107	850	380	420	793	733
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	72.5	52.5	52.5	66.2	46.8	46.8	72.3	44.1	44.7	57.2	26.0	26.2
Incr Delay (d2), s/veh	39.4	20.7	30.2	54.4	58.4	72.5	21.5	0.2	0.7	98.7	0.9	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	22.2	25.5	11.1	36.6	40.2	2.0	1.2	1.8	28.8	5.9	5.7
LnGrp Delay(d),s/veh	111.9	73.2	82.8	120.6	105.2	119.3	93.8	44.3	45.5	155.9	26.9	27.2
LnGrp LOS	F	E	F	F	F	F	F	D	D	F	C	C
Approach Vol, veh/h		1499			2335			162			918	
Approach Delay, s/veh		77.5			110.9			56.9			95.9	
Approach LOS		E			F			E			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	40.0	40.5	21.5	47.9	8.9	71.6	8.5	60.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	35.5	36.0	17.0	43.5	9.0	62.5	5.0	55.5
Max Q Clear Time (g_c+I1), s	37.5	5.9	18.4	43.3	5.4	14.1	5.1	58.4
Green Ext Time (p_c), s	0.0	3.5	0.0	0.1	0.0	3.6	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	96.1
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	609	96	341	620	99	115	44	357	141	66	77
Future Volume (veh/h)	30	609	96	341	620	99	115	44	357	141	66	77
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	32	648	102	363	660	105	122	47	380	150	70	82
Adj No. of Lanes	1	3	0	1	3	0	1	2	0	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	52	1012	157	405	1892	298	536	725	649	285	725	649
Arrive On Green	0.03	0.23	0.23	0.23	0.43	0.43	0.41	0.41	0.41	0.41	0.41	0.41
Sat Flow, veh/h	1774	4440	691	1774	4433	697	1230	1770	1583	957	1770	1583
Grp Volume(v), veh/h	32	493	257	363	503	262	122	47	380	150	70	82
Grp Sat Flow(s),veh/h/ln	1774	1695	1741	1774	1695	1740	1230	1770	1583	957	1770	1583
Q Serve(g_s), s	1.8	13.2	13.5	20.0	10.1	10.2	6.9	1.6	18.8	14.6	2.4	3.2
Cycle Q Clear(g_c), s	1.8	13.2	13.5	20.0	10.1	10.2	10.2	1.6	18.8	33.3	2.4	3.2
Prop In Lane	1.00		0.40	1.00		0.40	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	52	773	397	405	1447	743	536	725	649	285	725	649
V/C Ratio(X)	0.61	0.64	0.65	0.90	0.35	0.35	0.23	0.06	0.59	0.53	0.10	0.13
Avail Cap(c_a), veh/h	114	932	479	660	1975	1013	536	725	649	285	725	649
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.3	35.1	35.2	37.7	19.4	19.5	21.7	18.0	23.1	36.0	18.3	18.5
Incr Delay (d2), s/veh	11.2	1.1	2.3	9.4	0.1	0.3	1.0	0.2	3.8	6.8	0.3	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	6.3	6.7	10.8	4.7	4.9	2.5	0.8	8.8	4.4	1.2	1.5
LnGrp Delay(d),s/veh	59.5	36.2	37.5	47.1	19.6	19.8	22.7	18.2	26.9	42.8	18.5	18.9
LnGrp LOS	E	D	D	D	B	B	C	B	C	D	B	B
Approach Vol, veh/h		782			1128			549			302	
Approach Delay, s/veh		37.6			28.5			25.2			30.7	
Approach LOS		D			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		45.8	27.5	27.5		45.8	7.5	47.5
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		41.3	37.5	27.7		41.3	6.5	58.7
Max Q Clear Time (g_c+I1), s		20.8	22.0	15.5		35.3	3.8	12.2
Green Ext Time (p_c), s		5.1	1.0	7.5		2.6	0.0	14.5

Intersection Summary	
HCM 2010 Ctrl Delay	30.7
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	286	203	43	313	14	220	60	23	27	99	10
Future Volume (veh/h)	17	286	203	43	313	14	220	60	23	27	99	10
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	18	304	216	46	333	15	234	64	24	29	105	11
Adj No. of Lanes	1	3	1	1	3	0	2	2	0	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	40	1459	454	88	1565	70	412	522	186	61	383	40
Arrive On Green	0.02	0.29	0.29	0.05	0.31	0.31	0.12	0.20	0.20	0.03	0.12	0.12
Sat Flow, veh/h	1774	5085	1583	1774	4991	223	3442	2559	912	1774	3239	335
Grp Volume(v), veh/h	18	304	216	46	225	123	234	43	45	29	57	59
Grp Sat Flow(s),veh/h/ln	1774	1695	1583	1774	1695	1823	1721	1770	1702	1774	1770	1804
Q Serve(g_s), s	0.4	1.9	4.8	1.1	2.1	2.1	2.7	0.8	0.9	0.7	1.2	1.3
Cycle Q Clear(g_c), s	0.4	1.9	4.8	1.1	2.1	2.1	2.7	0.8	0.9	0.7	1.2	1.3
Prop In Lane	1.00		1.00	1.00		0.12	1.00		0.54	1.00		0.19
Lane Grp Cap(c), veh/h	40	1459	454	88	1063	572	412	361	347	61	209	213
V/C Ratio(X)	0.45	0.21	0.48	0.53	0.21	0.21	0.57	0.12	0.13	0.48	0.27	0.28
Avail Cap(c_a), veh/h	399	3909	1217	566	2927	1574	1750	1904	1831	441	1444	1472
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.4	11.4	12.5	19.6	10.7	10.7	17.6	13.7	13.8	20.1	17.0	17.0
Incr Delay (d2), s/veh	7.7	0.1	0.8	4.8	0.1	0.2	1.2	0.1	0.2	5.8	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.9	2.1	0.6	1.0	1.1	1.3	0.4	0.4	0.4	0.6	0.7
LnGrp Delay(d),s/veh	28.1	11.5	13.2	24.4	10.8	10.9	18.8	13.9	13.9	25.8	17.7	17.7
LnGrp LOS	C	B	B	C	B	B	B	B	B	C	B	B
Approach Vol, veh/h		538			394			322			145	
Approach Delay, s/veh		12.8			12.4			17.5			19.3	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.9	13.1	6.6	16.6	9.6	9.5	5.5	17.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	45.5	13.5	32.5	21.5	34.5	9.5	36.5
Max Q Clear Time (g_c+I1), s	2.7	2.9	3.1	6.8	4.7	3.3	2.4	4.1
Green Ext Time (p_c), s	0.0	1.2	0.0	5.4	0.7	1.2	0.0	5.6

Intersection Summary	
HCM 2010 Ctrl Delay	14.4
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	1575	209	176	1276	13	55	5	192	18	38	27
Future Volume (veh/h)	11	1575	209	176	1276	13	55	5	192	18	38	27
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	11	1641	218	183	1329	14	57	5	200	19	40	28
Adj No. of Lanes	1	3	0	1	3	1	1	1	0	1	1	2
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	22	2007	266	209	2782	866	73	11	453	33	503	752
Arrive On Green	0.01	0.44	0.44	0.12	0.55	0.55	0.04	0.29	0.29	0.02	0.27	0.27
Sat Flow, veh/h	1774	4545	602	1774	5085	1583	1774	39	1550	1774	1863	2787
Grp Volume(v), veh/h	11	1223	636	183	1329	14	57	0	205	19	40	28
Grp Sat Flow(s),veh/h/ln	1774	1695	1757	1774	1695	1583	1774	0	1589	1774	1863	1393
Q Serve(g_s), s	0.9	43.8	44.1	14.1	22.3	0.6	4.4	0.0	14.6	1.5	2.2	1.0
Cycle Q Clear(g_c), s	0.9	43.8	44.1	14.1	22.3	0.6	4.4	0.0	14.6	1.5	2.2	1.0
Prop In Lane	1.00		0.34	1.00		1.00	1.00		0.98	1.00		1.00
Lane Grp Cap(c), veh/h	22	1497	776	209	2782	866	73	0	465	33	503	752
V/C Ratio(X)	0.50	0.82	0.82	0.88	0.48	0.02	0.78	0.00	0.44	0.57	0.08	0.04
Avail Cap(c_a), veh/h	65	1525	790	300	2960	922	109	0	465	70	503	752
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	68.2	33.9	34.0	60.3	19.3	14.4	66.0	0.0	40.0	67.6	37.9	37.4
Incr Delay (d2), s/veh	16.3	3.5	6.8	17.9	0.1	0.0	18.8	0.0	3.0	14.6	0.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	21.1	22.8	8.0	10.4	0.2	2.6	0.0	6.8	0.9	1.2	0.4
LnGrp Delay(d),s/veh	84.5	37.4	40.7	78.2	19.4	14.4	84.8	0.0	43.0	82.2	38.2	37.5
LnGrp LOS	F	D	D	E	B	B	F		D	F	D	D
Approach Vol, veh/h		1870			1526			262			87	
Approach Delay, s/veh		38.8			26.4			52.1			47.6	
Approach LOS		D			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.1	45.1	20.9	65.9	10.2	42.0	6.2	80.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	40.5	23.5	62.5	8.5	37.5	5.1	80.9
Max Q Clear Time (g_c+I1), s	3.5	16.6	16.1	46.1	6.4	4.2	2.9	24.3
Green Ext Time (p_c), s	0.0	1.6	0.3	15.3	0.0	1.8	0.0	46.0

Intersection Summary	
HCM 2010 Ctrl Delay	34.9
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1676	759	0	1678	291	359	0	582	0	0	0
Future Volume (veh/h)	0	1676	759	0	1678	291	359	0	582	0	0	0
Number	7	4	14	3	8	18	5	2	12			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	0	1863	1863	0	1863	1863	1900	1863	1863			
Adj Flow Rate, veh/h	0	2019	0	0	2022	0	433	201	567			
Adj No. of Lanes	0	3	1	0	3	1	0	1	1			
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83			
Percent Heavy Veh, %	0	2	2	0	2	2	2	2	2			
Cap, veh/h	0	2312	720	0	2312	720	560	260	721			
Arrive On Green	0.00	0.45	0.00	0.00	0.45	0.00	0.46	0.46	0.46			
Sat Flow, veh/h	0	5253	1583	0	5253	1583	1230	571	1583			
Grp Volume(v), veh/h	0	2019	0	0	2022	0	634	0	567			
Grp Sat Flow(s),veh/h/ln	0	1695	1583	0	1695	1583	1801	0	1583			
Q Serve(g_s), s	0.0	35.9	0.0	0.0	36.0	0.0	29.6	0.0	30.4			
Cycle Q Clear(g_c), s	0.0	35.9	0.0	0.0	36.0	0.0	29.6	0.0	30.4			
Prop In Lane	0.00		1.00	0.00		1.00	0.68		1.00			
Lane Grp Cap(c), veh/h	0	2312	720	0	2312	720	820	0	721			
V/C Ratio(X)	0.00	0.87	0.00	0.00	0.87	0.00	0.77	0.00	0.79			
Avail Cap(c_a), veh/h	0	2316	721	0	2316	721	820	0	721			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	24.6	0.0	0.0	24.7	0.0	22.9	0.0	23.1			
Incr Delay (d2), s/veh	0.0	4.0	0.0	0.0	4.1	0.0	7.0	0.0	8.5			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	17.5	0.0	0.0	17.5	0.0	16.2	0.0	14.9			
LnGrp Delay(d),s/veh	0.0	28.7	0.0	0.0	28.7	0.0	29.9	0.0	31.5			
LnGrp LOS		C			C		C		C			
Approach Vol, veh/h		2019			2022			1201				
Approach Delay, s/veh		28.7			28.7			30.7				
Approach LOS		C			C			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		50.0		49.9				49.9
Change Period (Y+Rc), s		4.5		4.5				4.5
Max Green Setting (Gmax), s		45.5		45.5				45.5
Max Q Clear Time (g_c+I1), s		32.4		37.9				38.0
Green Ext Time (p_c), s		5.6		7.5				7.5

Intersection Summary	
HCM 2010 Ctrl Delay	29.1
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	287	655	187	286	968	344	132	104	192	269	799	339
Future Volume (veh/h)	287	655	187	286	968	344	132	104	192	269	799	339
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	334	762	217	333	1126	400	153	121	223	313	929	394
Adj No. of Lanes	2	3	1	2	3	1	2	2	1	2	2	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	396	1285	400	391	1278	398	199	1411	631	370	1089	458
Arrive On Green	0.12	0.25	0.25	0.11	0.25	0.25	0.06	0.40	0.40	0.11	0.45	0.45
Sat Flow, veh/h	3442	5085	1583	3442	5085	1583	3442	3539	1583	3442	2431	1021
Grp Volume(v), veh/h	334	762	217	333	1126	400	153	121	223	313	674	649
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1695	1583	1721	1770	1583	1721	1770	1682
Q Serve(g_s), s	13.4	18.6	16.8	13.4	30.1	35.5	6.2	3.0	13.9	12.6	47.9	48.9
Cycle Q Clear(g_c), s	13.4	18.6	16.8	13.4	30.1	35.5	6.2	3.0	13.9	12.6	47.9	48.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.61
Lane Grp Cap(c), veh/h	396	1285	400	391	1278	398	199	1411	631	370	793	754
V/C Ratio(X)	0.84	0.59	0.54	0.85	0.88	1.01	0.77	0.09	0.35	0.85	0.85	0.86
Avail Cap(c_a), veh/h	602	1383	430	531	1278	398	207	1411	631	504	793	754
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	61.2	46.4	45.7	61.4	50.8	52.9	65.6	26.4	29.7	61.9	34.7	35.0
Incr Delay (d2), s/veh	6.8	0.6	1.2	9.5	7.4	46.4	15.3	0.1	1.6	9.5	11.0	12.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.8	8.8	7.5	6.9	15.0	20.7	3.4	1.5	6.3	6.5	25.8	25.3
LnGrp Delay(d),s/veh	68.0	47.0	46.9	71.0	58.3	99.3	80.9	26.6	31.3	71.4	45.8	47.3
LnGrp LOS	E	D	D	E	E	F	F	C	C	E	D	D
Approach Vol, veh/h		1313			1859			497			1636	
Approach Delay, s/veh		52.3			69.4			45.4			51.3	
Approach LOS		D			E			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.7	60.8	20.6	40.2	12.7	67.8	20.8	40.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	20.7	51.1	21.8	38.4	8.5	63.3	24.7	35.5
Max Q Clear Time (g_c+I1), s	14.6	15.9	15.4	20.6	8.2	50.9	15.4	37.5
Green Ext Time (p_c), s	0.6	15.2	0.6	13.9	0.0	8.2	0.8	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	57.3
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	38	159	132	258	209	181	113	435	74	212	1168	49
Future Volume (veh/h)	38	159	132	258	209	181	113	435	74	212	1168	49
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	39	164	136	266	215	187	116	448	76	219	1204	51
Adj No. of Lanes	1	2	0	1	2	1	2	3	1	2	3	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	62	294	229	305	1034	463	182	1963	611	293	2127	662
Arrive On Green	0.03	0.16	0.16	0.17	0.29	0.29	0.05	0.39	0.39	0.09	0.42	0.42
Sat Flow, veh/h	1774	1897	1475	1774	3539	1583	3442	5085	1583	3442	5085	1583
Grp Volume(v), veh/h	39	152	148	266	215	187	116	448	76	219	1204	51
Grp Sat Flow(s),veh/h/ln	1774	1770	1602	1774	1770	1583	1721	1695	1583	1721	1695	1583
Q Serve(g_s), s	1.9	7.1	7.6	13.0	4.1	8.4	2.9	5.3	2.8	5.5	16.1	1.7
Cycle Q Clear(g_c), s	1.9	7.1	7.6	13.0	4.1	8.4	2.9	5.3	2.8	5.5	16.1	1.7
Prop In Lane	1.00		0.92	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	62	275	249	305	1034	463	182	1963	611	293	2127	662
V/C Ratio(X)	0.63	0.55	0.59	0.87	0.21	0.40	0.64	0.23	0.12	0.75	0.57	0.08
Avail Cap(c_a), veh/h	137	792	717	378	2065	924	243	1963	611	336	2127	662
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.5	34.8	35.0	36.0	23.8	25.3	41.4	18.4	17.6	39.8	19.8	15.6
Incr Delay (d2), s/veh	10.2	1.7	2.3	16.8	0.1	0.6	3.7	0.3	0.4	7.7	1.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	3.6	3.5	7.8	2.0	3.8	1.5	2.5	1.3	3.0	7.7	0.8
LnGrp Delay(d),s/veh	52.7	36.5	37.3	52.8	23.9	25.9	45.0	18.7	18.1	47.5	20.9	15.8
LnGrp LOS	D	D	D	D	C	C	D	B	B	D	C	B
Approach Vol, veh/h		339			668			640			1474	
Approach Delay, s/veh		38.7			36.0			23.4			24.6	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.1	38.9	19.8	18.3	9.2	41.8	7.6	30.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	8.7	34.4	19.0	39.9	6.3	36.8	6.9	52.0
Max Q Clear Time (g_c+I1), s	7.5	7.3	15.0	9.6	4.9	18.1	3.9	10.4
Green Ext Time (p_c), s	0.1	14.8	0.3	4.2	0.0	11.8	0.0	4.3

Intersection Summary	
HCM 2010 Ctrl Delay	28.3
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	94	10	50	10	10	10	64	473	10	10	709	170
Future Volume (veh/h)	94	10	50	10	10	10	64	473	10	10	709	170
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	103	11	55	11	11	11	70	520	11	11	779	187
Adj No. of Lanes	1	2	0	1	2	1	1	2	1	1	2	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	152	236	211	24	216	97	94	2060	921	24	1537	369
Arrive On Green	0.09	0.13	0.13	0.01	0.06	0.06	0.05	0.58	0.58	0.01	0.54	0.54
Sat Flow, veh/h	1774	1770	1583	1774	3539	1583	1774	3539	1583	1774	2832	680
Grp Volume(v), veh/h	103	11	55	11	11	11	70	520	11	11	487	479
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	1770	1583	1774	1770	1743
Q Serve(g_s), s	3.9	0.4	2.2	0.4	0.2	0.5	2.7	5.0	0.2	0.4	12.1	12.1
Cycle Q Clear(g_c), s	3.9	0.4	2.2	0.4	0.2	0.5	2.7	5.0	0.2	0.4	12.1	12.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.39
Lane Grp Cap(c), veh/h	152	236	211	24	216	97	94	2060	921	24	960	946
V/C Ratio(X)	0.68	0.05	0.26	0.45	0.05	0.11	0.74	0.25	0.01	0.45	0.51	0.51
Avail Cap(c_a), veh/h	789	787	704	129	258	115	216	2060	921	129	960	946
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.0	26.4	27.2	34.2	30.9	31.0	32.6	7.2	6.2	34.2	10.1	10.1
Incr Delay (d2), s/veh	5.2	0.1	0.7	12.5	0.1	0.5	10.9	0.3	0.0	12.5	1.9	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	0.2	1.0	0.3	0.1	0.2	1.6	2.5	0.1	0.3	6.3	6.2
LnGrp Delay(d),s/veh	36.2	26.5	27.9	46.7	31.0	31.6	43.5	7.5	6.2	46.7	12.0	12.0
LnGrp LOS	D	C	C	D	C	C	D	A	A	D	B	B
Approach Vol, veh/h		169			33			601			977	
Approach Delay, s/veh		32.8			36.4			11.6			12.4	
Approach LOS		C			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.5	45.2	5.5	13.8	8.2	42.4	10.5	8.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.1	40.7	5.1	31.1	8.5	37.3	31.1	5.1
Max Q Clear Time (g_c+I1), s	2.4	7.0	2.4	4.2	4.7	14.1	5.9	2.5
Green Ext Time (p_c), s	0.0	13.1	0.0	0.4	0.0	11.1	0.2	0.1

Intersection Summary	
HCM 2010 Ctrl Delay	14.5
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	116	11	173	33	33	10	133	330	16	10	786	658
Future Volume (veh/h)	116	11	173	33	33	10	133	330	16	10	786	658
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	126	12	188	36	36	11	145	359	17	11	854	715
Adj No. of Lanes	1	1	1	1	2	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	159	276	235	59	249	73	181	2058	97	24	1803	807
Arrive On Green	0.09	0.15	0.15	0.03	0.09	0.09	0.10	0.60	0.60	0.01	0.51	0.51
Sat Flow, veh/h	1774	1863	1583	1774	2704	789	1774	3441	162	1774	3539	1583
Grp Volume(v), veh/h	126	12	188	36	23	24	145	184	192	11	854	715
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1770	1723	1774	1770	1834	1774	1770	1583
Q Serve(g_s), s	6.1	0.5	10.0	1.7	1.0	1.1	7.0	4.1	4.1	0.5	13.6	35.2
Cycle Q Clear(g_c), s	6.1	0.5	10.0	1.7	1.0	1.1	7.0	4.1	4.1	0.5	13.6	35.2
Prop In Lane	1.00		1.00	1.00		0.46	1.00		0.09	1.00		1.00
Lane Grp Cap(c), veh/h	159	276	235	59	163	159	181	1058	1097	24	1803	807
V/C Ratio(X)	0.79	0.04	0.80	0.61	0.14	0.15	0.80	0.17	0.17	0.46	0.47	0.89
Avail Cap(c_a), veh/h	295	817	694	136	618	601	336	1058	1097	102	1803	807
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.8	31.8	35.8	41.5	36.4	36.4	38.2	7.8	7.9	42.7	13.8	19.1
Incr Delay (d2), s/veh	8.5	0.1	6.2	9.7	0.4	0.4	7.9	0.4	0.3	13.3	0.9	13.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	0.3	4.7	1.0	0.5	0.6	3.8	2.1	2.2	0.4	6.9	18.3
LnGrp Delay(d),s/veh	47.3	31.9	42.0	51.2	36.8	36.8	46.2	8.2	8.2	56.0	14.7	32.8
LnGrp LOS	D	C	D	D	D	D	D	A	A	E	B	C
Approach Vol, veh/h		326			83			521			1580	
Approach Delay, s/veh		43.7			43.0			18.8			23.2	
Approach LOS		D			D			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.7	56.6	7.4	17.4	13.4	48.9	12.3	12.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	52.1	6.7	38.2	16.5	40.6	14.5	30.4
Max Q Clear Time (g_c+I1), s	2.5	6.1	3.7	12.0	9.0	37.2	8.1	3.1
Green Ext Time (p_c), s	0.0	17.4	0.0	0.9	0.2	2.8	0.1	0.9

Intersection Summary	
HCM 2010 Ctrl Delay	25.6
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	186	106	19	32	105	106	10	409	91	102	467	298
Future Volume (veh/h)	186	106	19	32	105	106	10	409	91	102	467	298
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	186	106	19	32	105	106	10	409	91	102	467	298
Adj No. of Lanes	1	2	1	1	2	1	1	2	1	1	2	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	246	839	375	63	475	213	23	1052	471	134	1273	570
Arrive On Green	0.14	0.24	0.24	0.04	0.13	0.13	0.01	0.30	0.30	0.08	0.36	0.36
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	186	106	19	32	105	106	10	409	91	102	467	298
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	5.1	1.2	0.5	0.9	1.3	3.2	0.3	4.7	2.2	2.9	4.9	7.5
Cycle Q Clear(g_c), s	5.1	1.2	0.5	0.9	1.3	3.2	0.3	4.7	2.2	2.9	4.9	7.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	246	839	375	63	475	213	23	1052	471	134	1273	570
V/C Ratio(X)	0.76	0.13	0.05	0.50	0.22	0.50	0.44	0.39	0.19	0.76	0.37	0.52
Avail Cap(c_a), veh/h	891	3241	1450	262	1986	889	192	2265	1013	541	2962	1325
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.0	15.2	15.0	24.0	19.6	20.4	24.9	14.2	13.3	23.0	12.0	12.8
Incr Delay (d2), s/veh	4.7	0.1	0.1	6.1	0.2	1.8	12.4	0.2	0.2	8.6	0.2	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	0.6	0.2	0.5	0.7	1.5	0.2	2.3	1.0	1.7	2.4	3.4
LnGrp Delay(d),s/veh	25.8	15.3	15.0	30.1	19.8	22.2	37.3	14.4	13.5	31.7	12.2	13.6
LnGrp LOS	C	B	B	C	B	C	D	B	B	C	B	B
Approach Vol, veh/h		311			243			510			867	
Approach Delay, s/veh		21.5			22.2			14.7			14.9	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.3	19.6	6.3	16.5	5.2	22.8	11.5	11.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	15.5	32.5	7.5	46.5	5.5	42.5	25.5	28.5
Max Q Clear Time (g_c+I1), s	4.9	6.7	2.9	3.2	2.3	9.5	7.1	5.2
Green Ext Time (p_c), s	0.2	8.2	0.0	1.9	0.0	8.7	0.5	1.7

Intersection Summary	
HCM 2010 Ctrl Delay	16.9
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	33	44	10	97	10	198	195	10	10	859	253
Future Volume (veh/h)	29	33	44	10	97	10	198	195	10	10	859	253
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	29	33	44	10	97	10	198	195	10	10	859	253
Adj No. of Lanes	1	2	1	1	2	1	1	2	0	1	2	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	56	341	153	23	274	123	252	2019	103	23	1242	365
Arrive On Green	0.03	0.10	0.10	0.01	0.08	0.08	0.14	0.59	0.59	0.01	0.46	0.46
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1774	3427	175	1774	2698	794
Grp Volume(v), veh/h	29	33	44	10	97	10	198	100	105	10	563	549
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	1770	1832	1774	1770	1723
Q Serve(g_s), s	1.0	0.5	1.6	0.3	1.6	0.4	6.7	1.5	1.6	0.3	15.7	15.7
Cycle Q Clear(g_c), s	1.0	0.5	1.6	0.3	1.6	0.4	6.7	1.5	1.6	0.3	15.7	15.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.10	1.00		0.46
Lane Grp Cap(c), veh/h	56	341	153	23	274	123	252	1043	1079	23	814	793
V/C Ratio(X)	0.52	0.10	0.29	0.44	0.35	0.08	0.79	0.10	0.10	0.44	0.69	0.69
Avail Cap(c_a), veh/h	157	1562	699	145	1539	689	584	1826	1891	145	1389	1352
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.7	25.7	26.2	30.5	27.3	26.7	25.8	5.6	5.6	30.5	13.3	13.3
Incr Delay (d2), s/veh	7.2	0.1	1.0	12.9	0.8	0.3	5.4	0.0	0.0	12.9	1.1	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.3	0.7	0.3	0.8	0.2	3.7	0.8	0.8	0.3	7.7	7.6
LnGrp Delay(d),s/veh	36.8	25.8	27.2	43.5	28.0	27.0	31.2	5.6	5.6	43.5	14.4	14.4
LnGrp LOS	D	C	C	D	C	C	C	A	A	D	B	B
Approach Vol, veh/h		106			117			403			1122	
Approach Delay, s/veh		29.4			29.3			18.2			14.7	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.3	41.2	5.3	10.5	13.3	33.2	6.5	9.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.1	64.3	5.1	27.5	20.5	48.9	5.5	27.1
Max Q Clear Time (g_c+I1), s	2.3	3.6	2.3	3.6	8.7	17.7	3.0	3.6
Green Ext Time (p_c), s	0.0	12.6	0.0	0.9	0.4	10.9	0.0	0.9

Intersection Summary	
HCM 2010 Ctrl Delay	17.3
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	257	1073	145	228	10	462	784	99	10	2074	10
Future Volume (veh/h)	10	257	1073	145	228	10	462	784	99	10	2074	10
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	10	257	1073	145	228	10	462	784	99	10	2074	10
Adj No. of Lanes	2	2	2	2	2	1	2	3	1	2	3	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	40	948	746	165	1077	482	472	2767	862	40	2129	663
Arrive On Green	0.01	0.27	0.27	0.05	0.30	0.30	0.14	0.54	0.54	0.01	0.42	0.42
Sat Flow, veh/h	3442	3539	2787	3442	3539	1583	3442	5085	1583	3442	5085	1583
Grp Volume(v), veh/h	10	257	1073	145	228	10	462	784	99	10	2074	10
Grp Sat Flow(s),veh/h/ln	1721	1770	1393	1721	1770	1583	1721	1695	1583	1721	1695	1583
Q Serve(g_s), s	0.4	8.0	37.5	5.9	6.7	0.6	18.7	11.6	4.3	0.4	56.1	0.5
Cycle Q Clear(g_c), s	0.4	8.0	37.5	5.9	6.7	0.6	18.7	11.6	4.3	0.4	56.1	0.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	40	948	746	165	1077	482	472	2767	862	40	2129	663
V/C Ratio(X)	0.25	0.27	1.44	0.88	0.21	0.02	0.98	0.28	0.11	0.25	0.97	0.02
Avail Cap(c_a), veh/h	123	948	746	165	1077	482	472	2767	862	123	2129	663
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	68.6	40.5	51.3	66.3	36.2	34.1	60.2	17.2	15.5	68.6	40.0	23.8
Incr Delay (d2), s/veh	3.3	0.2	204.5	38.2	0.1	0.0	35.8	0.3	0.3	3.3	14.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	3.9	35.7	3.7	3.3	0.3	11.3	5.5	1.9	0.2	28.9	0.2
LnGrp Delay(d),s/veh	71.9	40.6	255.8	104.5	36.3	34.1	96.0	17.4	15.8	71.9	54.3	23.9
LnGrp LOS	E	D	F	F	D	C	F	B	B	E	D	C
Approach Vol, veh/h		1340			383			1345			2094	
Approach Delay, s/veh		213.1			62.1			44.3			54.2	
Approach LOS		F			E			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.1	80.7	11.2	42.0	23.7	63.1	6.1	47.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	72.8	6.7	37.5	19.2	58.6	5.0	39.2
Max Q Clear Time (g_c+I1), s	2.4	13.6	7.9	39.5	20.7	58.1	2.4	8.7
Green Ext Time (p_c), s	0.0	45.2	0.0	0.0	0.0	0.5	0.0	10.0

Intersection Summary	
HCM 2010 Ctrl Delay	93.5
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	193	17	312	129	663	52	1522	1067	523	723	13
Future Volume (veh/h)	30	193	17	312	129	663	52	1522	1067	523	723	13
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	33	210	18	339	140	721	57	1654	1160	568	786	14
Adj No. of Lanes	1	3	0	1	3	1	1	3	2	2	3	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	46	1294	109	288	2071	645	73	1505	825	485	2035	36
Arrive On Green	0.03	0.27	0.27	0.16	0.41	0.41	0.04	0.30	0.30	0.14	0.40	0.40
Sat Flow, veh/h	1774	4780	402	1774	5085	1583	1774	5085	2787	3442	5145	92
Grp Volume(v), veh/h	33	148	80	339	140	721	57	1654	1160	568	518	282
Grp Sat Flow(s),veh/h/ln	1774	1695	1792	1774	1695	1583	1774	1695	1393	1721	1695	1847
Q Serve(g_s), s	2.6	4.6	4.7	22.5	2.3	56.4	4.4	41.0	41.0	19.5	15.1	15.1
Cycle Q Clear(g_c), s	2.6	4.6	4.7	22.5	2.3	56.4	4.4	41.0	41.0	19.5	15.1	15.1
Prop In Lane	1.00		0.22	1.00		1.00	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	46	918	485	288	2071	645	73	1505	825	485	1341	730
V/C Ratio(X)	0.72	0.16	0.17	1.18	0.07	1.12	0.78	1.10	1.41	1.17	0.39	0.39
Avail Cap(c_a), veh/h	65	955	505	288	2071	645	129	1505	825	485	1341	730
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.9	38.5	38.6	58.0	25.0	41.0	65.8	48.7	48.7	59.5	29.9	29.9
Incr Delay (d2), s/veh	19.2	0.1	0.2	109.5	0.0	72.6	16.1	55.1	190.0	97.6	0.8	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	2.2	2.4	19.7	1.1	37.5	2.5	26.8	37.5	15.8	7.2	8.0
LnGrp Delay(d),s/veh	86.2	38.6	38.7	167.5	25.0	113.6	81.8	103.9	238.8	157.0	30.7	31.4
LnGrp LOS	F	D	D	F	C	F	F	F	F	F	C	C
Approach Vol, veh/h		261			1200			2871			1368	
Approach Delay, s/veh		44.6			118.5			157.9			83.3	
Approach LOS		D			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	24.0	45.5	27.0	42.0	10.2	59.3	8.1	60.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	19.5	41.0	22.5	39.0	10.1	50.4	5.1	56.4
Max Q Clear Time (g_c+I1), s	21.5	43.0	24.5	6.7	6.4	17.1	4.6	58.4
Green Ext Time (p_c), s	0.0	0.0	0.0	6.2	0.0	29.5	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	126.5
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	252	1544	93	632	1128	556	123	916	660	585	469	77
Future Volume (veh/h)	252	1544	93	632	1128	556	123	916	660	585	469	77
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	283	1735	104	710	1267	625	138	1029	742	657	527	87
Adj No. of Lanes	2	4	0	2	3	1	2	2	2	2	2	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	319	1557	93	608	1698	529	184	1026	808	562	1217	200
Arrive On Green	0.09	0.25	0.25	0.18	0.33	0.33	0.05	0.29	0.29	0.16	0.40	0.40
Sat Flow, veh/h	3442	6229	373	3442	5085	1583	3442	3539	2787	3442	3043	501
Grp Volume(v), veh/h	283	1338	501	710	1267	625	138	1029	742	657	306	308
Grp Sat Flow(s),veh/h/ln	1721	1602	1797	1721	1695	1583	1721	1770	1393	1721	1770	1774
Q Serve(g_s), s	12.2	37.5	37.5	26.5	33.1	50.1	5.9	43.5	38.6	24.5	18.8	18.9
Cycle Q Clear(g_c), s	12.2	37.5	37.5	26.5	33.1	50.1	5.9	43.5	38.6	24.5	18.8	18.9
Prop In Lane	1.00		0.21	1.00		1.00	1.00		1.00	1.00		0.28
Lane Grp Cap(c), veh/h	319	1201	449	608	1698	529	184	1026	808	562	708	710
V/C Ratio(X)	0.89	1.11	1.11	1.17	0.75	1.18	0.75	1.00	0.92	1.17	0.43	0.43
Avail Cap(c_a), veh/h	319	1201	449	608	1698	529	252	1026	808	562	708	710
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	67.3	56.3	56.3	61.8	44.3	50.0	70.0	53.3	51.5	62.8	32.6	32.7
Incr Delay (d2), s/veh	24.6	63.2	77.3	92.3	1.8	99.9	8.0	28.7	17.1	93.9	1.9	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.9	23.6	28.2	20.4	15.8	36.6	3.0	25.3	16.8	19.0	9.5	9.6
LnGrp Delay(d),s/veh	91.9	119.5	133.6	154.1	46.1	149.9	78.0	82.0	68.6	156.6	34.6	34.6
LnGrp LOS	F	F	F	F	D	F	E	F	E	F	C	C
Approach Vol, veh/h		2122			2602			1909			1271	
Approach Delay, s/veh		119.1			100.5			76.5			97.7	
Approach LOS		F			F			E			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	29.0	48.0	31.0	42.0	12.5	64.5	18.4	54.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	24.5	43.5	26.5	37.5	11.0	57.0	13.9	50.1
Max Q Clear Time (g_c+I1), s	26.5	45.5	28.5	39.5	7.9	20.9	14.2	52.1
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.1	21.6	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	99.2
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	176	740	126	142	704	115	121	1045	252	99	551	71
Future Volume (veh/h)	176	740	126	142	704	115	121	1045	252	99	551	71
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	178	747	127	143	711	116	122	1056	255	100	557	72
Adj No. of Lanes	2	3	1	2	3	1	1	2	1	1	2	1
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	245	1273	396	205	1215	378	152	1582	708	126	1532	685
Arrive On Green	0.07	0.25	0.25	0.06	0.24	0.24	0.09	0.45	0.45	0.07	0.43	0.43
Sat Flow, veh/h	3442	5085	1583	3442	5085	1583	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	178	747	127	143	711	116	122	1056	255	100	557	72
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1695	1583	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	5.3	13.5	6.9	4.3	13.0	6.3	7.1	24.7	11.1	5.8	11.1	2.8
Cycle Q Clear(g_c), s	5.3	13.5	6.9	4.3	13.0	6.3	7.1	24.7	11.1	5.8	11.1	2.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	245	1273	396	205	1215	378	152	1582	708	126	1532	685
V/C Ratio(X)	0.73	0.59	0.32	0.70	0.59	0.31	0.80	0.67	0.36	0.79	0.36	0.11
Avail Cap(c_a), veh/h	367	1653	515	279	1522	474	267	1582	708	211	1532	685
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.7	34.5	32.0	48.4	35.3	32.8	47.1	22.9	19.1	47.9	20.0	17.7
Incr Delay (d2), s/veh	4.1	0.4	0.5	4.6	0.5	0.5	9.5	2.2	1.4	10.5	0.7	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	6.4	3.0	2.2	6.1	2.8	3.9	12.5	5.1	3.2	5.6	1.3
LnGrp Delay(d),s/veh	51.8	35.0	32.5	53.0	35.8	33.2	56.6	25.1	20.5	58.5	20.7	18.0
LnGrp LOS	D	C	C	D	D	C	E	C	C	E	C	B
Approach Vol, veh/h		1052			970			1433			729	
Approach Delay, s/veh		37.5			38.0			27.0			25.6	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	51.4	10.8	30.8	13.5	49.9	12.0	29.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	12.5	46.9	8.5	34.1	15.8	43.6	11.2	31.4
Max Q Clear Time (g_c+I1), s	7.8	26.7	6.3	15.5	9.1	13.1	7.3	15.0
Green Ext Time (p_c), s	0.1	12.9	0.1	10.7	0.1	16.5	0.2	9.9

Intersection Summary	
HCM 2010 Ctrl Delay	31.9
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	203	67	49	10	143	484	77	3041	0	225	2060	115
Future Volume (veh/h)	203	67	49	10	143	484	77	3041	0	225	2060	115
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	221	73	53	11	155	526	84	3305	0	245	2239	125
Adj No. of Lanes	1	3	0	1	3	1	1	3	0	2	3	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	160	1168	545	22	1356	422	104	2373	0	195	2293	127
Arrive On Green	0.09	0.34	0.34	0.01	0.27	0.27	0.06	0.47	0.00	0.06	0.46	0.46
Sat Flow, veh/h	1774	3390	1583	1774	5085	1583	1774	5253	0	3442	4931	273
Grp Volume(v), veh/h	221	73	53	11	155	526	84	3305	0	245	1534	830
Grp Sat Flow(s),veh/h/ln	1774	1695	1583	1774	1695	1583	1774	1695	0	1721	1695	1814
Q Serve(g_s), s	13.5	2.2	3.4	0.9	3.5	40.0	7.0	70.0	0.0	8.5	66.4	67.6
Cycle Q Clear(g_c), s	13.5	2.2	3.4	0.9	3.5	40.0	7.0	70.0	0.0	8.5	66.4	67.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.00	1.00		0.15
Lane Grp Cap(c), veh/h	160	1168	545	22	1356	422	104	2373	0	195	1576	844
V/C Ratio(X)	1.38	0.06	0.10	0.51	0.11	1.25	0.81	1.39	0.00	1.26	0.97	0.98
Avail Cap(c_a), veh/h	160	1168	545	71	1356	422	115	2373	0	195	1576	844
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	68.3	32.9	33.4	73.6	41.6	55.0	69.8	40.0	0.0	70.8	39.2	39.6
Incr Delay (d2), s/veh	206.8	0.0	0.1	17.0	0.0	129.1	31.6	179.4	0.0	150.1	17.2	27.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.8	1.0	1.5	0.6	1.6	32.6	4.4	72.1	0.0	8.1	34.7	40.2
LnGrp Delay(d),s/veh	275.1	33.0	33.4	90.6	41.6	184.1	101.4	219.4	0.0	220.8	56.4	66.7
LnGrp LOS	F	C	C	F	D	F	F	F		F	E	E
Approach Vol, veh/h		347			692			3389			2609	
Approach Delay, s/veh		187.2			150.7			216.4			75.1	
Approach LOS		F			F			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.0	74.5	6.3	56.2	13.3	74.2	18.0	44.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	8.5	70.0	6.0	47.5	9.7	68.8	13.5	40.0
Max Q Clear Time (g_c+I1), s	10.5	72.0	2.9	5.4	9.0	69.6	15.5	42.0
Green Ext Time (p_c), s	0.0	0.0	0.0	4.3	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	156.1
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	142	419	336	79	570	110	646	401	60	71	191	112
Future Volume (veh/h)	142	419	336	79	570	110	646	401	60	71	191	112
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	151	446	357	84	606	117	687	427	64	76	203	119
Adj No. of Lanes	2	3	1	1	3	1	2	2	1	1	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	209	1298	404	107	1295	403	788	1711	766	97	1095	490
Arrive On Green	0.06	0.26	0.26	0.06	0.25	0.25	0.23	0.48	0.48	0.05	0.31	0.31
Sat Flow, veh/h	3442	5085	1583	1774	5085	1583	3442	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	151	446	357	84	606	117	687	427	64	76	203	119
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1774	1695	1583	1721	1770	1583	1774	1770	1583
Q Serve(g_s), s	5.3	8.8	26.7	5.7	12.4	7.3	23.7	8.7	2.7	5.2	5.2	6.9
Cycle Q Clear(g_c), s	5.3	8.8	26.7	5.7	12.4	7.3	23.7	8.7	2.7	5.2	5.2	6.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	209	1298	404	107	1295	403	788	1711	766	97	1095	490
V/C Ratio(X)	0.72	0.34	0.88	0.79	0.47	0.29	0.87	0.25	0.08	0.78	0.19	0.24
Avail Cap(c_a), veh/h	378	1343	418	223	1426	444	1217	1711	766	209	1095	490
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.8	37.4	44.1	57.1	38.8	36.9	45.7	18.7	17.1	57.4	31.1	31.7
Incr Delay (d2), s/veh	4.7	0.2	19.0	12.0	0.3	0.4	4.6	0.3	0.2	12.7	0.4	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	4.1	13.8	3.2	5.9	3.3	11.8	4.4	1.2	2.9	2.6	3.2
LnGrp Delay(d),s/veh	61.4	37.6	63.1	69.1	39.1	37.3	50.3	19.0	17.3	70.2	31.5	32.9
LnGrp LOS	E	D	E	E	D	D	D	B	B	E	C	C
Approach Vol, veh/h		954			807			1178			398	
Approach Delay, s/veh		50.9			41.9			37.2			39.3	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.2	64.0	11.9	35.9	32.7	42.6	12.0	35.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	14.5	59.5	15.5	32.5	43.5	30.5	13.5	34.5
Max Q Clear Time (g_c+I1), s	7.2	10.7	7.7	28.7	25.7	8.9	7.3	14.4
Green Ext Time (p_c), s	0.1	5.5	0.1	2.7	2.5	4.9	0.2	9.3

Intersection Summary	
HCM 2010 Ctrl Delay	42.5
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	395	462	340	267	198	103	224	406	399	94	228	170
Future Volume (veh/h)	395	462	340	267	198	103	224	406	399	94	228	170
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	395	462	340	267	198	103	224	406	399	94	228	170
Adj No. of Lanes	1	2	0	1	2	0	1	2	1	1	2	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	428	535	392	296	458	229	253	1257	562	117	549	392
Arrive On Green	0.24	0.27	0.27	0.17	0.20	0.20	0.14	0.36	0.36	0.07	0.28	0.28
Sat Flow, veh/h	1774	1950	1430	1774	2288	1143	1774	3539	1583	1774	1974	1410
Grp Volume(v), veh/h	395	419	383	267	151	150	224	406	399	94	203	195
Grp Sat Flow(s),veh/h/ln	1774	1770	1610	1774	1770	1661	1774	1770	1583	1774	1770	1614
Q Serve(g_s), s	28.5	29.5	29.6	19.3	9.8	10.4	16.2	10.9	28.4	6.8	12.3	13.0
Cycle Q Clear(g_c), s	28.5	29.5	29.6	19.3	9.8	10.4	16.2	10.9	28.4	6.8	12.3	13.0
Prop In Lane	1.00		0.89	1.00		0.69	1.00		1.00	1.00		0.87
Lane Grp Cap(c), veh/h	428	485	442	296	354	333	253	1257	562	117	492	449
V/C Ratio(X)	0.92	0.86	0.87	0.90	0.43	0.45	0.88	0.32	0.71	0.80	0.41	0.43
Avail Cap(c_a), veh/h	630	547	498	427	354	333	404	1257	562	183	492	449
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.5	45.2	45.2	53.5	45.8	46.0	55.1	30.7	36.4	60.3	38.5	38.8
Incr Delay (d2), s/veh	14.7	12.3	13.7	16.6	0.8	1.0	13.1	0.7	7.4	13.1	2.5	3.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.7	16.1	14.9	10.9	4.9	4.9	8.9	5.5	13.6	3.8	6.3	6.2
LnGrp Delay(d),s/veh	63.2	57.5	59.0	70.0	46.6	47.0	68.2	31.4	43.8	73.4	41.1	41.8
LnGrp LOS	E	E	E	E	D	D	E	C	D	E	D	D
Approach Vol, veh/h		1197			568			1029			492	
Approach Delay, s/veh		59.8			57.7			44.2			47.5	
Approach LOS		E			E			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.1	51.0	26.4	40.4	23.2	40.9	36.1	30.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	13.5	46.5	31.5	40.5	29.8	30.2	46.5	25.5
Max Q Clear Time (g_c+I1), s	8.8	30.4	21.3	31.6	18.2	15.0	30.5	12.4
Green Ext Time (p_c), s	0.1	6.2	0.6	4.3	0.5	6.0	1.1	5.9

Intersection Summary	
HCM 2010 Ctrl Delay	52.7
HCM 2010 LOS	D

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1133	223	720	1150	273	758
Future Volume (vph)	1133	223	720	1150	273	758
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5	4.5	4.5	4.5
Lane Util. Factor	0.91		1.00	0.91	1.00	0.88
Frt	0.98		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	4960		1770	5085	1770	2787
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	4960		1770	5085	1770	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1193	235	758	1211	287	798
RTOR Reduction (vph)	21	0	0	0	0	602
Lane Group Flow (vph)	1407	0	758	1211	287	196
Turn Type	NA		Prot	NA	Perm	Perm
Protected Phases	4		3	8		
Permitted Phases					2	2
Actuated Green, G (s)	36.6		55.5	96.6	34.4	34.4
Effective Green, g (s)	36.6		55.5	96.6	34.4	34.4
Actuated g/C Ratio	0.26		0.40	0.69	0.25	0.25
Clearance Time (s)	4.5		4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1296		701	3508	434	684
v/s Ratio Prot	c0.28		c0.43	0.24		
v/s Ratio Perm					c0.16	0.07
v/c Ratio	1.09		1.08	0.35	0.66	0.29
Uniform Delay, d1	51.7		42.2	8.8	47.6	42.8
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	51.8		58.1	0.1	7.7	1.1
Delay (s)	103.5		100.3	8.9	55.3	43.9
Level of Service	F		F	A	E	D
Approach Delay (s)	103.5			44.1	46.9	
Approach LOS	F			D	D	

Intersection Summary			
HCM 2000 Control Delay	63.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	93.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	561	199	171	489	281	338	1154	506	232	642	22
Future Volume (veh/h)	16	561	199	171	489	281	338	1154	506	232	642	22
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	18	616	219	188	537	309	371	1268	556	255	705	24
Adj No. of Lanes	1	3	0	1	2	1	2	3	1	1	3	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	33	927	323	214	1243	556	439	1672	520	282	1820	62
Arrive On Green	0.02	0.25	0.25	0.12	0.35	0.35	0.13	0.33	0.33	0.16	0.36	0.36
Sat Flow, veh/h	1774	3726	1298	1774	3539	1583	3442	5085	1583	1774	5051	171
Grp Volume(v), veh/h	18	559	276	188	537	309	371	1268	556	255	473	256
Grp Sat Flow(s),veh/h/ln	1774	1695	1634	1774	1770	1583	1721	1695	1583	1774	1695	1832
Q Serve(g_s), s	1.3	18.7	19.3	13.2	14.7	19.9	13.3	28.1	41.5	17.8	13.1	13.1
Cycle Q Clear(g_c), s	1.3	18.7	19.3	13.2	14.7	19.9	13.3	28.1	41.5	17.8	13.1	13.1
Prop In Lane	1.00		0.79	1.00		1.00	1.00		1.00	1.00		0.09
Lane Grp Cap(c), veh/h	33	844	407	214	1243	556	439	1672	520	282	1222	660
V/C Ratio(X)	0.55	0.66	0.68	0.88	0.43	0.56	0.85	0.76	1.07	0.90	0.39	0.39
Avail Cap(c_a), veh/h	80	1061	511	246	1438	643	608	1672	520	330	1222	660
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	61.4	42.7	42.8	54.6	31.3	33.0	53.9	37.9	42.4	52.1	30.0	30.0
Incr Delay (d2), s/veh	13.4	1.1	2.5	25.8	0.2	0.9	7.8	3.3	58.9	24.5	0.9	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	8.9	8.9	8.0	7.2	8.8	6.8	13.7	26.7	10.6	6.3	6.9
LnGrp Delay(d),s/veh	74.8	43.7	45.4	80.4	31.6	33.9	61.7	41.2	101.3	76.7	30.9	31.8
LnGrp LOS	E	D	D	F	C	C	E	D	F	E	C	C
Approach Vol, veh/h		853			1034			2195			984	
Approach Delay, s/veh		44.9			41.1			59.9			43.0	
Approach LOS		D			D			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	24.6	46.0	19.8	35.9	20.6	50.0	6.8	48.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	23.5	41.5	17.5	39.5	22.3	42.7	5.7	51.3
Max Q Clear Time (g_c+I1), s	19.8	43.5	15.2	21.3	15.3	15.1	3.3	21.9
Green Ext Time (p_c), s	0.3	0.0	0.1	10.2	0.8	19.9	0.0	13.1

Intersection Summary	
HCM 2010 Ctrl Delay	50.3
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1542	775	192	310	1042	297	325	2297	198	177	1166	1048
Future Volume (veh/h)	1542	775	192	310	1042	297	325	2297	198	177	1166	1048
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	1590	799	198	320	1074	306	335	2368	204	182	1202	1080
Adj No. of Lanes	2	3	1	2	3	0	2	3	1	2	3	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	677	1891	589	373	1115	318	195	1846	575	126	1744	543
Arrive On Green	0.20	0.37	0.37	0.11	0.28	0.28	0.06	0.36	0.36	0.04	0.34	0.34
Sat Flow, veh/h	3442	5085	1583	3442	3934	1121	3442	5085	1583	3442	5085	1583
Grp Volume(v), veh/h	1590	799	198	320	925	455	335	2368	204	182	1202	1080
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1695	1665	1721	1695	1583	1721	1695	1583
Q Serve(g_s), s	29.5	17.5	13.5	13.7	40.3	40.3	8.5	54.4	14.1	5.5	30.5	51.4
Cycle Q Clear(g_c), s	29.5	17.5	13.5	13.7	40.3	40.3	8.5	54.4	14.1	5.5	30.5	51.4
Prop In Lane	1.00		1.00	1.00		0.67	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	677	1891	589	373	961	472	195	1846	575	126	1744	543
V/C Ratio(X)	2.35	0.42	0.34	0.86	0.96	0.96	1.72	1.28	0.35	1.44	0.69	1.99
Avail Cap(c_a), veh/h	677	1891	589	482	964	473	195	1846	575	126	1744	543
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.2	35.1	33.8	65.7	52.9	52.9	70.7	47.7	34.9	72.2	42.4	49.2
Incr Delay (d2), s/veh	610.9	0.2	0.3	11.7	20.5	32.0	343.1	131.6	1.7	237.4	2.3	451.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	71.4	8.2	5.9	7.1	21.6	22.8	13.3	47.8	6.4	6.8	14.6	90.5
LnGrp Delay(d),s/veh	671.1	35.2	34.1	77.4	73.4	84.9	413.8	179.4	36.6	309.6	44.6	500.9
LnGrp LOS	F	D	C	E	E	F	F	F	D	F	D	F
Approach Vol, veh/h		2587			1700			2907			2464	
Approach Delay, s/veh		425.9			77.2			196.4			264.2	
Approach LOS		F			E			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	58.9	20.7	60.2	13.0	55.9	34.0	47.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	54.4	21.0	51.1	8.5	51.4	29.5	42.6
Max Q Clear Time (g_c+I1), s	7.5	56.4	15.7	19.5	10.5	53.4	31.5	42.3
Green Ext Time (p_c), s	0.0	0.0	0.5	21.6	0.0	0.0	0.0	0.1

Intersection Summary	
HCM 2010 Ctrl Delay	254.2
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	143	1094	69	212	672	656	187	454	610	539	261	126
Future Volume (veh/h)	143	1094	69	212	672	656	187	454	610	539	261	126
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	155	1189	75	230	730	713	203	493	663	586	284	137
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	2	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	148	1071	67	207	619	554	225	525	470	516	380	183
Arrive On Green	0.08	0.32	0.32	0.12	0.35	0.35	0.13	0.30	0.30	0.15	0.32	0.32
Sat Flow, veh/h	1774	3382	213	1774	1770	1583	1774	1770	1583	3442	1188	573
Grp Volume(v), veh/h	155	622	642	230	730	713	203	493	663	586	0	421
Grp Sat Flow(s),veh/h/ln	1774	1770	1825	1774	1770	1583	1774	1770	1583	1721	0	1762
Q Serve(g_s), s	12.5	47.5	47.5	17.5	52.5	52.5	16.9	40.7	44.5	22.5	0.0	32.0
Cycle Q Clear(g_c), s	12.5	47.5	47.5	17.5	52.5	52.5	16.9	40.7	44.5	22.5	0.0	32.0
Prop In Lane	1.00		0.12	1.00		1.00	1.00		1.00	1.00		0.33
Lane Grp Cap(c), veh/h	148	560	578	207	619	554	225	525	470	516	0	563
V/C Ratio(X)	1.05	1.11	1.11	1.11	1.18	1.29	0.90	0.94	1.41	1.14	0.00	0.75
Avail Cap(c_a), veh/h	148	560	578	207	619	554	254	525	470	516	0	563
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	68.8	51.3	51.3	66.3	48.8	48.8	64.5	51.4	52.8	63.8	0.0	45.6
Incr Delay (d2), s/veh	87.5	71.6	71.8	95.6	96.4	142.2	29.7	26.7	197.5	82.4	0.0	8.8
Initial Q Delay(d3),s/veh	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.7	34.3	35.4	14.1	42.2	44.8	10.2	23.8	45.2	16.6	0.0	16.9
LnGrp Delay(d),s/veh	156.4	122.9	123.1	161.8	145.1	191.0	94.3	78.2	250.2	146.2	0.0	54.4
LnGrp LOS	F	F	F	F	F	F	F	E	F	F		D
Approach Vol, veh/h		1419			1673			1359			1007	
Approach Delay, s/veh		126.6			167.0			164.5			107.8	
Approach LOS		F			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	27.0	49.0	22.0	52.0	23.6	52.4	17.0	57.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	22.5	44.5	17.5	47.5	21.5	45.5	12.5	52.5
Max Q Clear Time (g_c+I1), s	24.5	46.5	19.5	49.5	18.9	34.0	14.5	54.5
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.1	7.7	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	144.9
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1734	308	191	964	0	0	0	0	220	0	836
Future Volume (vph)	0	1734	308	191	964	0	0	0	0	220	0	836
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5					4.5	4.5	4.5
Lane Util. Factor		0.95	1.00	0.97	0.95					0.95	0.91	0.95
Frt		1.00	0.85	1.00	1.00					1.00	0.86	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	1.00	1.00
Satd. Flow (prot)		3539	1583	3433	3539					1681	1450	1504
Flt Permitted		1.00	1.00	0.95	1.00					0.95	1.00	1.00
Satd. Flow (perm)		3539	1583	3433	3539					1681	1450	1504
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	1788	318	197	994	0	0	0	0	227	0	862
RTOR Reduction (vph)	0	0	58	0	0	0	0	0	0	0	102	102
Lane Group Flow (vph)	0	1788	260	197	994	0	0	0	0	204	343	338
Turn Type		NA	Perm	Prot	NA					Prot	NA	Perm
Protected Phases		4		3	8					1	6	
Permitted Phases			4									6
Actuated Green, G (s)		52.5	52.5	6.9	63.9					27.1	27.1	27.1
Effective Green, g (s)		52.5	52.5	6.9	63.9					27.1	27.1	27.1
Actuated g/C Ratio		0.52	0.52	0.07	0.64					0.27	0.27	0.27
Clearance Time (s)		4.5	4.5	4.5	4.5					4.5	4.5	4.5
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Lane Grp Cap (vph)		1857	831	236	2261					455	392	407
v/s Ratio Prot		c0.51		c0.06	0.28					0.12	c0.24	
v/s Ratio Perm			0.16									0.22
v/c Ratio		0.96	0.31	0.83	0.44					0.45	0.87	0.83
Uniform Delay, d1		22.8	13.5	46.0	9.1					30.2	34.8	34.3
Progression Factor		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Incremental Delay, d2		13.2	0.2	21.7	0.1					0.7	19.0	17.6
Delay (s)		36.0	13.7	67.7	9.2					31.0	53.8	51.9
Level of Service		D	B	E	A					C	D	D
Approach Delay (s)		32.6			18.9			0.0			48.8	
Approach LOS		C			B			A			D	

Intersection Summary			
HCM 2000 Control Delay	32.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	79.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	176	1804	52	80	1865	467	52	311	191	467	81	121
Future Volume (veh/h)	176	1804	52	80	1865	467	52	311	191	467	81	121
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	187	1919	55	85	1984	497	55	331	203	497	86	129
Adj No. of Lanes	1	3	0	1	3	0	1	2	1	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	136	1982	57	101	1514	365	71	861	385	337	696	623
Arrive On Green	0.08	0.39	0.39	0.06	0.37	0.37	0.04	0.24	0.24	0.19	0.39	0.39
Sat Flow, veh/h	1774	5082	145	1774	4093	986	1774	3539	1583	1774	1770	1583
Grp Volume(v), veh/h	187	1279	695	85	1630	851	55	331	203	497	86	129
Grp Sat Flow(s),veh/h/ln	1774	1695	1837	1774	1695	1689	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	11.5	55.5	55.6	7.1	55.5	55.5	4.6	11.7	16.7	28.5	4.6	8.1
Cycle Q Clear(g_c), s	11.5	55.5	55.6	7.1	55.5	55.5	4.6	11.7	16.7	28.5	4.6	8.1
Prop In Lane	1.00		0.08	1.00		0.58	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	136	1322	716	101	1254	625	71	861	385	337	696	623
V/C Ratio(X)	1.37	0.97	0.97	0.85	1.30	1.36	0.78	0.38	0.53	1.47	0.12	0.21
Avail Cap(c_a), veh/h	136	1322	716	101	1254	625	121	861	385	337	696	623
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	69.3	44.8	44.9	70.1	47.3	47.3	71.4	47.4	49.3	60.8	29.0	30.0
Incr Delay (d2), s/veh	208.1	17.5	26.1	45.1	140.7	173.0	16.7	1.3	5.1	229.0	0.4	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.5	29.2	33.4	4.8	50.5	55.9	2.6	5.9	7.8	35.4	2.3	3.6
LnGrp Delay(d),s/veh	277.3	62.4	71.0	115.2	188.0	220.3	88.1	48.7	54.3	289.7	29.4	30.8
LnGrp LOS	F	E	E	F	F	F	F	D	D	F	C	C
Approach Vol, veh/h		2161			2566			589			712	
Approach Delay, s/veh		83.7			196.3			54.3			211.4	
Approach LOS		F			F			D			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	33.0	41.0	13.0	63.0	10.5	63.5	16.0	60.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	28.5	36.5	8.5	58.5	10.2	54.8	11.5	55.5
Max Q Clear Time (g_c+I1), s	30.5	18.7	9.1	57.6	6.6	10.1	13.5	57.5
Green Ext Time (p_c), s	0.0	4.0	0.0	0.9	0.0	4.8	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	143.9
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	87	858	82	372	697	151	71	49	313	110	49	50
Future Volume (veh/h)	87	858	82	372	697	151	71	49	313	110	49	50
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	93	913	87	396	741	161	76	52	333	117	52	53
Adj No. of Lanes	1	3	0	1	3	0	1	2	0	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	119	1300	124	438	1908	410	486	613	548	241	613	548
Arrive On Green	0.07	0.28	0.28	0.25	0.46	0.46	0.35	0.35	0.35	0.35	0.35	0.35
Sat Flow, veh/h	1774	4725	449	1774	4192	902	1284	1770	1583	994	1770	1583
Grp Volume(v), veh/h	93	654	346	396	598	304	76	52	333	117	52	53
Grp Sat Flow(s),veh/h/ln	1774	1695	1784	1774	1695	1704	1284	1770	1583	994	1770	1583
Q Serve(g_s), s	5.3	17.8	17.9	22.2	12.0	12.1	4.4	2.0	17.8	11.3	2.0	2.3
Cycle Q Clear(g_c), s	5.3	17.8	17.9	22.2	12.0	12.1	6.7	2.0	17.8	29.2	2.0	2.3
Prop In Lane	1.00		0.25	1.00		0.53	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	119	933	491	438	1543	775	486	613	548	241	613	548
V/C Ratio(X)	0.78	0.70	0.70	0.90	0.39	0.39	0.16	0.08	0.61	0.48	0.08	0.10
Avail Cap(c_a), veh/h	223	1028	541	690	1921	965	486	613	548	241	613	548
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.1	33.4	33.4	37.4	18.5	18.5	24.9	22.6	27.7	39.8	22.6	22.7
Incr Delay (d2), s/veh	10.7	1.9	3.7	10.4	0.2	0.3	0.7	0.3	4.9	6.8	0.3	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	8.5	9.3	12.2	5.6	5.7	1.6	1.0	8.5	3.6	1.0	1.1
LnGrp Delay(d),s/veh	57.8	35.3	37.1	47.8	18.6	18.8	25.6	22.8	32.7	46.6	22.8	23.0
LnGrp LOS	E	D	D	D	B	B	C	C	C	D	C	C
Approach Vol, veh/h		1093			1298			461			222	
Approach Delay, s/veh		37.8			27.6			30.4			35.4	
Approach LOS		D			C			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		40.0	29.8	32.7		40.0	11.4	51.2
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		35.5	39.9	31.1		35.5	12.9	58.1
Max Q Clear Time (g_c+I1), s		19.8	24.2	19.9		31.2	7.3	14.1
Green Ext Time (p_c), s		3.6	1.1	8.3		1.6	0.1	20.0

Intersection Summary	
HCM 2010 Ctrl Delay	32.2
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	335	340	16	346	22	137	55	35	12	27	10
Future Volume (veh/h)	16	335	340	16	346	22	137	55	35	12	27	10
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	17	356	362	17	368	23	146	59	37	13	29	11
Adj No. of Lanes	1	3	1	1	3	0	2	2	0	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	38	1961	611	38	1888	117	317	399	230	30	278	100
Arrive On Green	0.02	0.39	0.39	0.02	0.39	0.39	0.09	0.18	0.18	0.02	0.11	0.11
Sat Flow, veh/h	1774	5085	1583	1774	4897	303	3442	2162	1249	1774	2555	916
Grp Volume(v), veh/h	17	356	362	17	254	137	146	47	49	13	20	20
Grp Sat Flow(s),veh/h/ln	1774	1695	1583	1774	1695	1809	1721	1770	1642	1774	1770	1701
Q Serve(g_s), s	0.4	2.1	8.4	0.4	2.3	2.3	1.8	1.0	1.1	0.3	0.5	0.5
Cycle Q Clear(g_c), s	0.4	2.1	8.4	0.4	2.3	2.3	1.8	1.0	1.1	0.3	0.5	0.5
Prop In Lane	1.00		1.00	1.00		0.17	1.00		0.76	1.00		0.54
Lane Grp Cap(c), veh/h	38	1961	611	38	1307	698	317	326	303	30	193	185
V/C Ratio(X)	0.45	0.18	0.59	0.45	0.19	0.20	0.46	0.15	0.16	0.44	0.10	0.11
Avail Cap(c_a), veh/h	367	5042	1570	367	3361	1794	1162	1523	1414	290	1215	1168
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.2	9.3	11.2	22.2	9.4	9.4	19.8	15.7	15.7	22.4	18.4	18.4
Incr Delay (d2), s/veh	8.2	0.0	0.9	8.2	0.1	0.1	1.0	0.2	0.2	10.0	0.2	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	1.0	3.8	0.3	1.1	1.2	0.9	0.5	0.5	0.2	0.2	0.2
LnGrp Delay(d),s/veh	30.4	9.4	12.2	30.4	9.4	9.5	20.8	15.9	16.0	32.3	18.6	18.7
LnGrp LOS	C	A	B	C	A	A	C	B	B	C	B	B
Approach Vol, veh/h		735			408			242			53	
Approach Delay, s/veh		11.2			10.3			18.9			22.0	
Approach LOS		B			B			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.3	13.0	5.5	22.2	8.7	9.5	5.5	22.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	7.5	39.5	9.5	45.5	15.5	31.5	9.5	45.5
Max Q Clear Time (g_c+I1), s	2.3	3.1	2.4	10.4	3.8	2.5	2.4	4.3
Green Ext Time (p_c), s	0.0	0.8	0.0	7.3	0.3	0.7	0.0	7.5

Intersection Summary	
HCM 2010 Ctrl Delay	12.7
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	141	1717	27	137	1737	10	33	0	115	12	5	221
Future Volume (veh/h)	141	1717	27	137	1737	10	33	0	115	12	5	221
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	147	1789	28	143	1809	10	34	0	120	12	5	230
Adj No. of Lanes	1	3	0	1	3	1	1	1	0	1	1	2
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	173	2468	39	169	2422	754	47	0	446	24	500	748
Arrive On Green	0.10	0.48	0.48	0.10	0.48	0.48	0.03	0.00	0.28	0.01	0.27	0.27
Sat Flow, veh/h	1774	5158	81	1774	5085	1583	1774	0	1583	1774	1863	2787
Grp Volume(v), veh/h	147	1176	641	143	1809	10	34	0	120	12	5	230
Grp Sat Flow(s),veh/h/ln	1774	1695	1849	1774	1695	1583	1774	0	1583	1774	1863	1393
Q Serve(g_s), s	11.2	37.9	37.9	10.9	39.6	0.5	2.6	0.0	8.1	0.9	0.3	9.0
Cycle Q Clear(g_c), s	11.2	37.9	37.9	10.9	39.6	0.5	2.6	0.0	8.1	0.9	0.3	9.0
Prop In Lane	1.00		0.04	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	173	1622	885	169	2422	754	47	0	446	24	500	748
V/C Ratio(X)	0.85	0.72	0.73	0.85	0.75	0.01	0.72	0.00	0.27	0.51	0.01	0.31
Avail Cap(c_a), veh/h	279	1648	898	279	2472	770	97	0	446	71	500	748
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.8	28.5	28.5	60.9	29.1	18.9	66.1	0.0	38.2	67.0	36.7	39.9
Incr Delay (d2), s/veh	12.9	1.6	2.9	11.9	1.3	0.0	18.8	0.0	1.5	15.6	0.0	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.1	18.0	20.0	5.9	18.7	0.2	1.5	0.0	3.7	0.6	0.1	3.6
LnGrp Delay(d),s/veh	73.6	30.1	31.4	72.8	30.4	18.9	84.9	0.0	39.7	82.7	36.8	41.0
LnGrp LOS	E	C	C	E	C	B	F		D	F	D	D
Approach Vol, veh/h		1964			1962			154			247	
Approach Delay, s/veh		33.8			33.4			49.7			42.9	
Approach LOS		C			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.3	43.0	17.5	70.0	8.1	41.2	17.8	69.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	38.5	21.5	66.5	7.5	36.5	21.5	66.5
Max Q Clear Time (g_c+I1), s	2.9	10.1	12.9	39.9	4.6	11.0	13.2	41.6
Green Ext Time (p_c), s	0.0	1.7	0.2	25.1	0.0	1.7	0.2	23.6

Intersection Summary	
HCM 2010 Ctrl Delay	34.7
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1696	533	0	1682	93	528	0	599	0	0	0
Future Volume (veh/h)	0	1696	533	0	1682	93	528	0	599	0	0	0
Number	7	4	14	3	8	18	5	2	12			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	0	1863	1863	0	1863	1863	1900	1863	1863			
Adj Flow Rate, veh/h	0	2043	0	0	2027	0	636	64	679			
Adj No. of Lanes	0	3	1	0	3	1	0	1	1			
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83			
Percent Heavy Veh, %	0	2	2	0	2	2	2	2	2			
Cap, veh/h	0	2161	673	0	2161	673	785	79	768			
Arrive On Green	0.00	0.42	0.00	0.00	0.42	0.00	0.49	0.49	0.49			
Sat Flow, veh/h	0	5253	1583	0	5253	1583	1619	163	1583			
Grp Volume(v), veh/h	0	2043	0	0	2027	0	700	0	679			
Grp Sat Flow(s),veh/h/ln	0	1695	1583	0	1695	1583	1782	0	1583			
Q Serve(g_s), s	0.0	38.6	0.0	0.0	38.1	0.0	33.3	0.0	38.7			
Cycle Q Clear(g_c), s	0.0	38.6	0.0	0.0	38.1	0.0	33.3	0.0	38.7			
Prop In Lane	0.00		1.00	0.00		1.00	0.91		1.00			
Lane Grp Cap(c), veh/h	0	2161	673	0	2161	673	864	0	768			
V/C Ratio(X)	0.00	0.95	0.00	0.00	0.94	0.00	0.81	0.00	0.88			
Avail Cap(c_a), veh/h	0	2161	673	0	2161	673	864	0	768			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	27.6	0.0	0.0	27.5	0.0	21.8	0.0	23.2			
Incr Delay (d2), s/veh	0.0	9.5	0.0	0.0	8.7	0.0	8.1	0.0	14.1			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	19.9	0.0	0.0	19.4	0.0	18.3	0.0	19.8			
LnGrp Delay(d),s/veh	0.0	37.1	0.0	0.0	36.2	0.0	29.9	0.0	37.3			
LnGrp LOS		D			D		C		D			
Approach Vol, veh/h		2043			2027			1379				
Approach Delay, s/veh		37.1			36.2			33.6				
Approach LOS		D			D			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		53.0		47.0				47.0
Change Period (Y+Rc), s		4.5		4.5				4.5
Max Green Setting (Gmax), s		48.5		42.5				42.5
Max Q Clear Time (g_c+I1), s		40.7		40.6				40.1
Green Ext Time (p_c), s		4.6		1.9				2.4

Intersection Summary	
HCM 2010 Ctrl Delay	35.9
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	614	926	220	303	852	312	182	1008	231	426	532	272
Future Volume (veh/h)	614	926	220	303	852	312	182	1008	231	426	532	272
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	714	1077	256	352	991	363	212	1172	269	495	619	316
Adj No. of Lanes	2	3	1	2	3	1	2	2	1	2	2	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	702	1426	444	398	976	304	261	1206	539	493	927	473
Arrive On Green	0.20	0.28	0.28	0.12	0.19	0.19	0.08	0.34	0.34	0.14	0.41	0.41
Sat Flow, veh/h	3442	5085	1583	3442	5085	1583	3442	3539	1583	3442	2269	1158
Grp Volume(v), veh/h	714	1077	256	352	991	363	212	1172	269	495	483	452
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1695	1583	1721	1770	1583	1721	1770	1658
Q Serve(g_s), s	30.6	29.0	20.8	15.1	28.8	28.8	9.1	49.0	20.2	21.5	33.3	33.3
Cycle Q Clear(g_c), s	30.6	29.0	20.8	15.1	28.8	28.8	9.1	49.0	20.2	21.5	33.3	33.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.70
Lane Grp Cap(c), veh/h	702	1426	444	398	976	304	261	1206	539	493	723	677
V/C Ratio(X)	1.02	0.76	0.58	0.88	1.01	1.19	0.81	0.97	0.50	1.00	0.67	0.67
Avail Cap(c_a), veh/h	702	1426	444	431	976	304	351	1206	539	493	723	677
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	59.7	49.3	46.3	65.3	60.6	60.6	68.3	48.7	39.3	64.3	36.1	36.1
Incr Delay (d2), s/veh	38.3	2.4	1.8	18.2	32.6	115.0	10.2	20.0	3.3	41.4	4.9	5.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	18.3	13.9	9.3	8.2	16.4	22.3	4.7	27.3	9.4	13.0	17.2	16.2
LnGrp Delay(d),s/veh	98.0	51.6	48.2	83.6	93.2	175.6	78.5	68.8	42.5	105.6	41.0	41.3
LnGrp LOS	F	D	D	F	F	F	E	E	D	F	D	D
Approach Vol, veh/h		2047			1706			1653			1430	
Approach Delay, s/veh		67.4			108.7			65.8			63.4	
Approach LOS		E			F			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	26.0	55.6	21.8	46.6	15.9	65.7	35.1	33.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	21.5	51.1	18.8	40.6	15.3	57.3	30.6	28.8
Max Q Clear Time (g_c+I1), s	23.5	51.0	17.1	31.0	11.1	35.3	32.6	30.8
Green Ext Time (p_c), s	0.0	0.1	0.2	8.4	0.3	16.5	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	76.5
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	346	154	169	187	280	181	1619	500	291	914	41
Future Volume (veh/h)	130	346	154	169	187	280	181	1619	500	291	914	41
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	134	357	159	174	193	289	187	1669	515	300	942	42
Adj No. of Lanes	1	2	0	1	2	1	2	3	1	2	3	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	163	531	233	204	867	388	256	1939	604	363	2096	653
Arrive On Green	0.09	0.22	0.22	0.12	0.24	0.24	0.07	0.38	0.38	0.11	0.41	0.41
Sat Flow, veh/h	1774	2397	1050	1774	3539	1583	3442	5085	1583	3442	5085	1583
Grp Volume(v), veh/h	134	262	254	174	193	289	187	1669	515	300	942	42
Grp Sat Flow(s),veh/h/ln	1774	1770	1677	1774	1770	1583	1721	1695	1583	1721	1695	1583
Q Serve(g_s), s	7.6	13.8	14.2	9.8	4.4	17.2	5.4	30.8	30.4	8.7	13.6	1.6
Cycle Q Clear(g_c), s	7.6	13.8	14.2	9.8	4.4	17.2	5.4	30.8	30.4	8.7	13.6	1.6
Prop In Lane	1.00		0.63	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	163	392	372	204	867	388	256	1939	604	363	2096	653
V/C Ratio(X)	0.82	0.67	0.68	0.85	0.22	0.75	0.73	0.86	0.85	0.83	0.45	0.06
Avail Cap(c_a), veh/h	176	692	656	212	1457	652	391	1939	604	371	2096	653
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.5	36.3	36.4	44.3	30.8	35.6	46.2	29.1	28.9	44.7	21.6	18.1
Incr Delay (d2), s/veh	24.6	2.0	2.2	26.1	0.1	2.9	4.0	5.3	14.2	14.1	0.7	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	7.0	6.8	6.3	2.2	7.8	2.7	15.3	15.6	4.8	6.5	0.7
LnGrp Delay(d),s/veh	70.1	38.2	38.6	70.4	30.9	38.4	50.2	34.3	43.2	58.8	22.3	18.3
LnGrp LOS	E	D	D	E	C	D	D	C	D	E	C	B
Approach Vol, veh/h		650			656			2371			1284	
Approach Delay, s/veh		45.0			44.7			37.5			30.7	
Approach LOS		D			D			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.2	43.4	16.2	27.1	12.1	46.5	13.9	29.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	11.0	38.9	12.2	39.9	11.6	38.3	10.1	42.0
Max Q Clear Time (g_c+I1), s	10.7	32.8	11.8	16.2	7.4	15.6	9.6	19.2
Green Ext Time (p_c), s	0.0	5.8	0.0	5.9	0.2	20.1	0.0	5.8

Intersection Summary	
HCM 2010 Ctrl Delay	37.7
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	115	20	93	10	10	10	77	1089	10	10	566	84
Future Volume (veh/h)	115	20	93	10	10	10	77	1089	10	10	566	84
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	126	22	102	11	11	11	85	1197	11	11	622	92
Adj No. of Lanes	1	2	0	1	2	1	1	2	1	1	2	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	178	271	242	24	235	105	110	2015	902	24	1613	238
Arrive On Green	0.10	0.15	0.15	0.01	0.07	0.07	0.06	0.57	0.57	0.01	0.52	0.52
Sat Flow, veh/h	1774	1770	1583	1774	3539	1583	1774	3539	1583	1774	3095	457
Grp Volume(v), veh/h	126	22	102	11	11	11	85	1197	11	11	355	359
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	1770	1583	1774	1770	1782
Q Serve(g_s), s	5.0	0.8	4.2	0.4	0.2	0.5	3.4	15.8	0.2	0.4	8.7	8.7
Cycle Q Clear(g_c), s	5.0	0.8	4.2	0.4	0.2	0.5	3.4	15.8	0.2	0.4	8.7	8.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.26
Lane Grp Cap(c), veh/h	178	271	242	24	235	105	110	2015	902	24	922	929
V/C Ratio(X)	0.71	0.08	0.42	0.45	0.05	0.10	0.77	0.59	0.01	0.45	0.39	0.39
Avail Cap(c_a), veh/h	764	762	682	123	246	110	256	2015	902	123	922	929
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.4	26.1	27.6	35.2	31.5	31.6	33.3	10.1	6.7	35.2	10.3	10.3
Incr Delay (d2), s/veh	5.1	0.1	1.2	12.6	0.1	0.4	10.8	1.3	0.0	12.6	1.2	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	0.4	1.9	0.3	0.1	0.2	2.0	8.0	0.1	0.3	4.5	4.5
LnGrp Delay(d),s/veh	36.4	26.3	28.8	47.8	31.6	32.0	44.1	11.4	6.7	47.8	11.5	11.6
LnGrp LOS	D	C	C	D	C	C	D	B	A	D	B	B
Approach Vol, veh/h		250			33			1293			725	
Approach Delay, s/veh		32.4			37.1			13.5			12.1	
Approach LOS		C			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.5	45.5	5.5	15.5	9.0	42.0	11.7	9.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	41.0	5.0	31.0	10.4	35.6	31.0	5.0
Max Q Clear Time (g_c+I1), s	2.4	17.8	2.4	6.2	5.4	10.7	7.0	2.5
Green Ext Time (p_c), s	0.0	14.8	0.0	0.8	0.1	15.5	0.3	0.2

Intersection Summary	
HCM 2010 Ctrl Delay	15.4
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	642	26	291	16	19	10	211	984	33	10	407	353
Future Volume (veh/h)	642	26	291	16	19	10	211	984	33	10	407	353
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	698	28	316	17	21	11	229	1070	36	11	442	384
Adj No. of Lanes	1	1	1	1	2	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	591	683	581	34	122	59	216	1435	48	24	1070	479
Arrive On Green	0.33	0.37	0.37	0.02	0.05	0.05	0.12	0.41	0.41	0.01	0.30	0.30
Sat Flow, veh/h	1774	1863	1583	1774	2314	1120	1774	3494	118	1774	3539	1583
Grp Volume(v), veh/h	698	28	316	17	16	16	229	542	564	11	442	384
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1770	1665	1774	1770	1842	1774	1770	1583
Q Serve(g_s), s	31.5	0.9	14.9	0.9	0.8	0.9	11.5	24.6	24.6	0.6	9.4	21.1
Cycle Q Clear(g_c), s	31.5	0.9	14.9	0.9	0.8	0.9	11.5	24.6	24.6	0.6	9.4	21.1
Prop In Lane	1.00		1.00	1.00		0.67	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	591	683	581	34	94	88	216	727	756	24	1070	479
V/C Ratio(X)	1.18	0.04	0.54	0.50	0.17	0.19	1.06	0.75	0.75	0.47	0.41	0.80
Avail Cap(c_a), veh/h	591	1113	946	101	569	535	216	727	756	94	1070	479
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.5	19.3	23.7	46.0	42.8	42.9	41.5	23.7	23.7	46.3	26.3	30.4
Incr Delay (d2), s/veh	98.2	0.0	0.8	11.1	0.8	1.0	78.6	6.9	6.6	13.7	1.2	13.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	31.4	0.5	6.6	0.5	0.4	0.4	10.3	13.3	13.8	0.4	4.8	10.9
LnGrp Delay(d),s/veh	129.8	19.3	24.5	57.1	43.6	43.9	120.1	30.5	30.3	60.1	27.5	43.7
LnGrp LOS	F	B	C	E	D	D	F	C	C	E	C	D
Approach Vol, veh/h		1042			49			1335			837	
Approach Delay, s/veh		94.9			48.4			45.8			35.3	
Approach LOS		F			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.8	43.3	6.3	39.2	16.0	33.1	36.0	9.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	35.1	5.4	56.5	11.5	28.6	31.5	30.4
Max Q Clear Time (g_c+I1), s	2.6	26.6	2.9	16.9	13.5	23.1	33.5	2.9
Green Ext Time (p_c), s	0.0	6.4	0.0	1.5	0.0	4.4	0.0	1.5

Intersection Summary	
HCM 2010 Ctrl Delay	58.8
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	475	173	9	63	147	156	22	394	30	154	389	314
Future Volume (veh/h)	475	173	9	63	147	156	22	394	30	154	389	314
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	475	173	9	63	147	156	22	394	30	154	389	314
Adj No. of Lanes	1	2	1	1	2	1	1	2	1	1	2	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	531	1421	636	85	532	238	43	735	329	192	1032	462
Arrive On Green	0.30	0.40	0.40	0.05	0.15	0.15	0.02	0.21	0.21	0.11	0.29	0.29
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	475	173	9	63	147	156	22	394	30	154	389	314
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	19.7	2.4	0.3	2.7	2.8	7.1	0.9	7.6	1.2	6.5	6.7	13.5
Cycle Q Clear(g_c), s	19.7	2.4	0.3	2.7	2.8	7.1	0.9	7.6	1.2	6.5	6.7	13.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	531	1421	636	85	532	238	43	735	329	192	1032	462
V/C Ratio(X)	0.89	0.12	0.01	0.74	0.28	0.66	0.51	0.54	0.09	0.80	0.38	0.68
Avail Cap(c_a), veh/h	797	2382	1066	226	1244	557	132	1290	577	289	1603	717
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.8	14.5	13.8	36.1	28.9	30.8	37.0	27.1	24.6	33.4	21.7	24.0
Incr Delay (d2), s/veh	8.9	0.0	0.0	11.7	0.3	3.0	8.9	0.6	0.1	9.2	0.2	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.9	1.2	0.1	1.6	1.4	3.3	0.6	3.8	0.5	3.7	3.3	6.1
LnGrp Delay(d),s/veh	34.6	14.5	13.8	47.8	29.2	33.8	46.0	27.7	24.7	42.6	21.9	25.8
LnGrp LOS	C	B	B	D	C	C	D	C	C	D	C	C
Approach Vol, veh/h		657			366			446			857	
Approach Delay, s/veh		29.1			34.4			28.4			27.0	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.8	20.5	8.2	35.3	6.4	26.9	27.5	16.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	12.5	28.0	9.8	51.7	5.7	34.8	34.5	27.0
Max Q Clear Time (g_c+I1), s	8.5	9.6	4.7	4.4	2.9	15.5	21.7	9.1
Green Ext Time (p_c), s	0.1	6.3	0.0	2.8	0.0	6.5	1.3	2.4

Intersection Summary	
HCM 2010 Ctrl Delay	29.0
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	317	47	291	10	48	10	154	797	10	10	421	55
Future Volume (veh/h)	317	47	291	10	48	10	154	797	10	10	421	55
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	317	47	291	10	48	10	154	797	10	10	421	55
Adj No. of Lanes	1	2	1	1	2	1	1	2	0	1	2	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	386	1023	458	23	298	133	200	1367	17	23	888	115
Arrive On Green	0.22	0.29	0.29	0.01	0.08	0.08	0.11	0.38	0.38	0.01	0.28	0.28
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1774	3580	45	1774	3151	409
Grp Volume(v), veh/h	317	47	291	10	48	10	154	394	413	10	235	241
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	1770	1855	1774	1770	1791
Q Serve(g_s), s	10.1	0.6	9.5	0.3	0.7	0.3	5.0	10.5	10.5	0.3	6.5	6.6
Cycle Q Clear(g_c), s	10.1	0.6	9.5	0.3	0.7	0.3	5.0	10.5	10.5	0.3	6.5	6.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.02	1.00		0.23
Lane Grp Cap(c), veh/h	386	1023	458	23	298	133	200	676	708	23	499	505
V/C Ratio(X)	0.82	0.05	0.64	0.44	0.16	0.08	0.77	0.58	0.58	0.44	0.47	0.48
Avail Cap(c_a), veh/h	912	3132	1401	150	1611	721	493	1178	1235	150	835	845
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.1	15.2	18.4	29.1	25.2	25.0	25.6	14.6	14.6	29.1	17.6	17.7
Incr Delay (d2), s/veh	4.4	0.0	1.5	12.8	0.3	0.2	6.1	0.8	0.8	12.8	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	0.3	4.3	0.2	0.4	0.2	2.8	5.2	5.4	0.2	3.2	3.4
LnGrp Delay(d),s/veh	26.5	15.2	19.8	41.9	25.5	25.3	31.7	15.4	15.3	41.9	18.3	18.4
LnGrp LOS	C	B	B	D	C	C	C	B	B	D	B	B
Approach Vol, veh/h		655			68			961			486	
Approach Delay, s/veh		22.7			27.9			18.0			18.8	
Approach LOS		C			C			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.3	27.2	5.3	21.7	11.2	21.2	17.4	9.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	39.5	5.0	52.5	16.5	28.0	30.5	27.0
Max Q Clear Time (g_c+I1), s	2.3	12.5	2.3	11.5	7.0	8.6	12.1	2.7
Green Ext Time (p_c), s	0.0	9.3	0.0	1.7	0.3	8.1	0.9	1.6

Intersection Summary	
HCM 2010 Ctrl Delay	19.9
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	312	828	10	323	10	1300	2289	180	10	1287	10
Future Volume (veh/h)	10	312	828	10	323	10	1300	2289	180	10	1287	10
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	10	312	828	10	323	10	1300	2289	180	10	1287	10
Adj No. of Lanes	2	2	2	2	2	1	2	3	1	2	3	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	40	492	387	40	492	220	1393	3573	1112	40	1574	490
Arrive On Green	0.01	0.14	0.14	0.01	0.14	0.14	0.40	0.70	0.70	0.01	0.31	0.31
Sat Flow, veh/h	3442	3539	2787	3442	3539	1583	3442	5085	1583	3442	5085	1583
Grp Volume(v), veh/h	10	312	828	10	323	10	1300	2289	180	10	1287	10
Grp Sat Flow(s),veh/h/ln	1721	1770	1393	1721	1770	1583	1721	1695	1583	1721	1695	1583
Q Serve(g_s), s	0.4	11.1	18.5	0.4	11.5	0.7	48.1	32.4	5.1	0.4	31.1	0.6
Cycle Q Clear(g_c), s	0.4	11.1	18.5	0.4	11.5	0.7	48.1	32.4	5.1	0.4	31.1	0.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	40	492	387	40	492	220	1393	3573	1112	40	1574	490
V/C Ratio(X)	0.25	0.63	2.14	0.25	0.66	0.05	0.93	0.64	0.16	0.25	0.82	0.02
Avail Cap(c_a), veh/h	129	492	387	129	492	220	1513	3573	1112	129	1574	490
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.2	54.1	57.3	65.2	54.3	49.6	37.9	10.7	6.6	65.2	42.5	31.9
Incr Delay (d2), s/veh	3.2	2.7	520.5	3.2	3.2	0.1	10.5	0.9	0.3	3.2	4.8	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	5.6	35.1	0.2	5.9	0.3	24.8	15.3	2.3	0.2	15.2	0.3
LnGrp Delay(d),s/veh	68.4	56.8	577.8	68.4	57.4	49.7	48.4	11.6	7.0	68.4	47.3	32.0
LnGrp LOS	E	E	F	E	E	D	D	B	A	E	D	C
Approach Vol, veh/h		1150			343			3769			1307	
Approach Delay, s/veh		432.0			57.5			24.1			47.4	
Approach LOS		F			E			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.0	98.0	6.0	23.0	58.3	45.7	6.0	23.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	93.5	5.0	18.5	58.5	40.0	5.0	18.5
Max Q Clear Time (g_c+I1), s	2.4	34.4	2.4	20.5	50.1	33.1	2.4	13.5
Green Ext Time (p_c), s	0.0	53.6	0.0	0.0	3.7	6.8	0.0	3.2

Intersection Summary	
HCM 2010 Ctrl Delay	101.9
HCM 2010 LOS	F

FUTURE YEAR 2035 WITH PROJECT CONDITIONS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	67	12	973	87	299	13	455	253	814	985	10
Future Volume (veh/h)	23	67	12	973	87	299	13	455	253	814	985	10
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	25	73	13	1058	95	325	14	495	275	885	1071	11
Adj No. of Lanes	1	3	0	1	3	1	1	3	2	2	3	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	43	254	43	587	1854	577	28	1470	806	530	2217	23
Arrive On Green	0.02	0.06	0.06	0.33	0.36	0.36	0.02	0.29	0.29	0.15	0.43	0.43
Sat Flow, veh/h	1774	4380	742	1774	5085	1583	1774	5085	2787	3442	5190	53
Grp Volume(v), veh/h	25	56	30	1058	95	325	14	495	275	885	699	383
Grp Sat Flow(s),veh/h/ln	1774	1695	1732	1774	1695	1583	1774	1695	1393	1721	1695	1853
Q Serve(g_s), s	1.5	1.7	1.8	35.5	1.3	17.6	0.8	8.2	8.3	16.5	16.0	16.0
Cycle Q Clear(g_c), s	1.5	1.7	1.8	35.5	1.3	17.6	0.8	8.2	8.3	16.5	16.0	16.0
Prop In Lane	1.00		0.43	1.00		1.00	1.00		1.00	1.00		0.03
Lane Grp Cap(c), veh/h	43	197	101	587	1854	577	28	1470	806	530	1448	792
V/C Ratio(X)	0.58	0.28	0.30	1.80	0.05	0.56	0.50	0.34	0.34	1.67	0.48	0.48
Avail Cap(c_a), veh/h	103	1233	630	587	3239	1009	89	1470	806	530	1448	792
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.7	48.4	48.4	35.9	22.1	27.2	52.3	30.0	30.1	45.4	22.2	22.2
Incr Delay (d2), s/veh	11.5	0.8	1.7	367.3	0.0	0.9	12.9	0.6	1.2	310.2	1.2	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.8	0.9	77.2	0.6	7.8	0.5	3.9	3.3	30.6	7.7	8.6
LnGrp Delay(d),s/veh	63.2	49.1	50.1	403.2	22.1	28.1	65.2	30.6	31.2	355.6	23.3	24.3
LnGrp LOS	E	D	D	F	C	C	E	C	C	F	C	C
Approach Vol, veh/h		111			1478			784			1967	
Approach Delay, s/veh		52.6			296.2			31.5			173.0	
Approach LOS		D			F			C			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.0	35.5	40.0	10.7	6.2	50.3	7.1	43.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	16.5	31.0	35.5	39.0	5.4	42.1	6.2	68.3
Max Q Clear Time (g_c+I1), s	18.5	10.3	37.5	3.8	2.8	18.0	3.5	19.6
Green Ext Time (p_c), s	0.0	12.3	0.0	2.4	0.0	13.5	0.0	2.5

Intersection Summary	
HCM 2010 Ctrl Delay	186.3
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	77	858	148	718	1012	337	50	218	266	350	465	537
Future Volume (veh/h)	77	858	148	718	1012	337	50	218	266	350	465	537
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	87	964	166	807	1137	379	56	245	299	393	522	603
Adj No. of Lanes	2	4	0	2	3	1	2	2	2	2	2	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	132	1186	202	832	2120	660	110	1047	824	410	678	606
Arrive On Green	0.04	0.21	0.21	0.24	0.42	0.42	0.03	0.30	0.30	0.12	0.38	0.38
Sat Flow, veh/h	3442	5558	944	3442	5085	1583	3442	3539	2787	3442	1770	1583
Grp Volume(v), veh/h	87	832	298	807	1137	379	56	245	299	393	522	603
Grp Sat Flow(s),veh/h/ln	1721	1602	1696	1721	1695	1583	1721	1770	1393	1721	1770	1583
Q Serve(g_s), s	3.5	22.8	23.3	32.2	23.3	25.4	2.2	7.3	11.7	15.7	35.8	52.6
Cycle Q Clear(g_c), s	3.5	22.8	23.3	32.2	23.3	25.4	2.2	7.3	11.7	15.7	35.8	52.6
Prop In Lane	1.00		0.56	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	132	1026	362	832	2120	660	110	1047	824	410	678	606
V/C Ratio(X)	0.66	0.81	0.82	0.97	0.54	0.57	0.51	0.23	0.36	0.96	0.77	0.99
Avail Cap(c_a), veh/h	184	1075	379	832	2120	660	127	1047	824	410	678	606
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.8	51.8	52.0	52.0	30.3	31.0	66.0	36.9	38.5	60.7	37.4	42.6
Incr Delay (d2), s/veh	5.6	4.6	13.2	24.0	0.3	1.2	3.6	0.5	1.2	33.9	8.2	35.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	10.5	12.3	18.0	10.9	11.4	1.1	3.6	4.7	9.4	19.0	28.9
LnGrp Delay(d),s/veh	71.3	56.4	65.2	76.0	30.6	32.2	69.6	37.4	39.7	94.6	45.7	77.8
LnGrp LOS	E	E	E	E	C	C	E	D	D	F	D	E
Approach Vol, veh/h		1217			2323			600			1518	
Approach Delay, s/veh		59.7			46.6			41.6			71.1	
Approach LOS		E			D			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.0	45.5	38.0	34.1	8.9	57.6	9.8	62.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	16.5	41.0	33.5	31.0	5.1	52.4	7.4	57.1
Max Q Clear Time (g_c+I1), s	17.7	13.7	34.2	25.3	4.2	54.6	5.5	27.4
Green Ext Time (p_c), s	0.0	13.2	0.0	4.3	0.0	0.0	0.0	22.1

Intersection Summary	
HCM 2010 Ctrl Delay	55.5
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	77	495	77	143	566	176	131	220	132	133	767	87
Future Volume (veh/h)	77	495	77	143	566	176	131	220	132	133	767	87
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	78	500	78	144	572	178	132	222	133	134	775	88
Adj No. of Lanes	2	3	1	2	3	1	1	2	1	1	2	1
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	163	1070	333	217	1150	358	166	1536	687	168	1540	689
Arrive On Green	0.05	0.21	0.21	0.06	0.23	0.23	0.09	0.43	0.43	0.09	0.44	0.44
Sat Flow, veh/h	3442	5085	1583	3442	5085	1583	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	78	500	78	144	572	178	132	222	133	134	775	88
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1695	1583	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	2.0	7.8	3.7	3.7	8.9	8.9	6.6	3.4	4.7	6.7	14.4	3.0
Cycle Q Clear(g_c), s	2.0	7.8	3.7	3.7	8.9	8.9	6.6	3.4	4.7	6.7	14.4	3.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	163	1070	333	217	1150	358	166	1536	687	168	1540	689
V/C Ratio(X)	0.48	0.47	0.23	0.66	0.50	0.50	0.80	0.14	0.19	0.80	0.50	0.13
Avail Cap(c_a), veh/h	250	1928	600	397	2145	668	341	1536	687	341	1540	689
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.3	31.5	29.8	41.7	30.7	30.7	40.4	15.6	15.9	40.3	18.6	15.4
Incr Delay (d2), s/veh	2.2	0.3	0.4	3.5	0.3	1.1	8.3	0.2	0.6	8.3	1.2	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	3.7	1.7	1.9	4.2	4.0	3.6	1.7	2.2	3.7	7.2	1.4
LnGrp Delay(d),s/veh	44.4	31.8	30.2	45.2	31.0	31.8	48.7	15.8	16.5	48.6	19.8	15.8
LnGrp LOS	D	C	C	D	C	C	D	B	B	D	B	B
Approach Vol, veh/h		656			894			487			997	
Approach Delay, s/veh		33.1			33.5			24.9			23.3	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.1	44.0	10.2	23.7	13.0	44.1	8.8	25.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	17.5	39.5	10.5	34.5	17.5	39.5	6.6	38.4
Max Q Clear Time (g_c+I1), s	8.7	6.7	5.7	9.8	8.6	16.4	4.0	10.9
Green Ext Time (p_c), s	0.2	9.3	0.2	9.3	0.2	8.3	0.0	9.7

Intersection Summary	
HCM 2010 Ctrl Delay	28.7
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	165	104	104	10	71	187	99	1637	10	264	2371	151
Future Volume (veh/h)	165	104	104	10	71	187	99	1637	10	264	2371	151
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	179	113	113	11	77	203	108	1779	11	287	2577	164
Adj No. of Lanes	1	3	0	1	3	1	1	3	0	2	3	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	209	886	414	23	796	248	109	2491	15	346	2529	158
Arrive On Green	0.12	0.26	0.26	0.01	0.16	0.16	0.06	0.48	0.48	0.10	0.52	0.52
Sat Flow, veh/h	1774	3390	1583	1774	5085	1583	1774	5215	32	3442	4892	307
Grp Volume(v), veh/h	179	113	113	11	77	203	108	1156	634	287	1773	968
Grp Sat Flow(s),veh/h/ln	1774	1695	1583	1774	1695	1583	1774	1695	1857	1721	1695	1809
Q Serve(g_s), s	12.1	3.1	6.9	0.8	1.6	15.1	7.4	33.0	33.0	10.0	63.1	63.1
Cycle Q Clear(g_c), s	12.1	3.1	6.9	0.8	1.6	15.1	7.4	33.0	33.0	10.0	63.1	63.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.02	1.00		0.17
Lane Grp Cap(c), veh/h	209	886	414	23	796	248	109	1620	887	346	1752	935
V/C Ratio(X)	0.86	0.13	0.27	0.49	0.10	0.82	0.99	0.71	0.71	0.83	1.01	1.04
Avail Cap(c_a), veh/h	344	1289	602	73	1154	359	109	1620	887	420	1752	935
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.8	34.4	35.9	59.9	44.1	49.8	57.3	25.3	25.3	53.9	29.5	29.5
Incr Delay (d2), s/veh	10.9	0.1	0.4	15.3	0.1	9.4	83.2	2.7	4.9	11.1	24.5	38.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.5	1.5	3.1	0.5	0.7	7.2	6.1	16.0	18.1	5.3	35.4	41.5
LnGrp Delay(d),s/veh	63.7	34.5	36.2	75.1	44.2	59.2	140.4	28.0	30.2	65.0	54.0	68.4
LnGrp LOS	E	C	D	E	D	E	F	C	C	E	F	F
Approach Vol, veh/h		405			291			1898			3028	
Approach Delay, s/veh		47.9			55.8			35.1			59.6	
Approach LOS		D			E			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.8	62.8	6.1	36.4	12.0	67.6	18.9	23.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	14.9	55.7	5.0	46.4	7.5	63.1	23.7	27.7
Max Q Clear Time (g_c+I1), s	12.0	35.0	2.8	8.9	9.4	65.1	14.1	17.1
Green Ext Time (p_c), s	0.3	20.4	0.0	2.8	0.0	0.0	0.3	2.0

Intersection Summary	
HCM 2010 Ctrl Delay	50.3
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	59	180	397	71	931	55	249	110	41	44	302	369
Future Volume (veh/h)	59	180	397	71	931	55	249	110	41	44	302	369
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	63	191	422	76	990	59	265	117	44	47	321	393
Adj No. of Lanes	2	3	1	1	3	1	2	2	1	1	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	136	1476	459	98	1555	484	338	1599	715	62	1376	615
Arrive On Green	0.04	0.29	0.29	0.06	0.31	0.31	0.10	0.45	0.45	0.04	0.39	0.39
Sat Flow, veh/h	3442	5085	1583	1774	5085	1583	3442	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	63	191	422	76	990	59	265	117	44	47	321	393
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1774	1695	1583	1721	1770	1583	1774	1770	1583
Q Serve(g_s), s	1.9	3.0	27.7	4.5	18.0	2.9	8.1	2.0	1.7	2.8	6.5	21.7
Cycle Q Clear(g_c), s	1.9	3.0	27.7	4.5	18.0	2.9	8.1	2.0	1.7	2.8	6.5	21.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	136	1476	459	98	1555	484	338	1599	715	62	1376	615
V/C Ratio(X)	0.46	0.13	0.92	0.78	0.64	0.12	0.78	0.07	0.06	0.75	0.23	0.64
Avail Cap(c_a), veh/h	180	1492	465	207	1819	566	529	1599	715	157	1376	615
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.4	28.1	36.9	50.1	32.1	26.9	47.3	16.7	16.6	51.3	22.1	26.7
Incr Delay (d2), s/veh	2.5	0.0	23.2	12.3	0.6	0.1	4.0	0.1	0.2	16.7	0.4	5.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	1.4	15.1	2.6	8.5	1.3	4.0	1.0	0.8	1.7	3.3	10.3
LnGrp Delay(d),s/veh	52.9	28.1	60.0	62.4	32.7	27.0	51.3	16.8	16.7	68.0	22.5	31.7
LnGrp LOS	D	C	E	E	C	C	D	B	B	E	C	C
Approach Vol, veh/h		676			1125			426			761	
Approach Delay, s/veh		50.4			34.4			38.2			30.0	
Approach LOS		D			C			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.3	53.0	10.4	35.6	15.1	46.2	8.7	37.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.5	48.5	12.5	31.5	16.5	41.5	5.6	38.4
Max Q Clear Time (g_c+I1), s	4.8	4.0	6.5	29.7	10.1	23.7	3.9	20.0
Green Ext Time (p_c), s	0.0	5.0	0.1	1.5	0.5	4.3	0.0	9.9

Intersection Summary	
HCM 2010 Ctrl Delay	37.4
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	108	123	142	443	375	37	538	172	121	83	218	288
Future Volume (veh/h)	108	123	142	443	375	37	538	172	121	83	218	288
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	108	123	142	443	375	37	538	172	121	83	218	288
Adj No. of Lanes	1	2	0	1	2	0	1	2	1	1	2	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	131	214	192	463	1003	98	558	1531	685	104	312	279
Arrive On Green	0.07	0.12	0.12	0.26	0.31	0.31	0.31	0.43	0.43	0.06	0.18	0.18
Sat Flow, veh/h	1774	1770	1583	1774	3256	320	1774	3539	1583	1774	1770	1583
Grp Volume(v), veh/h	108	123	142	443	203	209	538	172	121	83	218	288
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1806	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	8.5	9.3	12.3	34.9	12.7	12.8	42.3	4.1	6.7	6.5	16.4	25.0
Cycle Q Clear(g_c), s	8.5	9.3	12.3	34.9	12.7	12.8	42.3	4.1	6.7	6.5	16.4	25.0
Prop In Lane	1.00		1.00	1.00		0.18	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	131	214	192	463	545	557	558	1531	685	104	312	279
V/C Ratio(X)	0.82	0.57	0.74	0.96	0.37	0.38	0.96	0.11	0.18	0.80	0.70	1.03
Avail Cap(c_a), veh/h	217	300	268	469	552	563	570	1531	685	169	312	279
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	64.7	58.8	60.1	51.6	38.3	38.4	47.8	24.0	24.7	65.9	54.8	58.3
Incr Delay (d2), s/veh	12.0	2.4	6.6	30.6	0.4	0.4	28.6	0.1	0.6	13.1	12.2	62.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	4.7	5.7	21.0	6.3	6.5	25.2	2.0	3.0	3.6	9.1	15.7
LnGrp Delay(d),s/veh	76.7	61.2	66.8	82.2	38.7	38.8	76.4	24.1	25.3	79.0	67.0	120.4
LnGrp LOS	E	E	E	F	D	D	E	C	C	E	E	F
Approach Vol, veh/h		373			855			831			589	
Approach Delay, s/veh		67.8			61.2			58.1			94.8	
Approach LOS		E			E			E			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.8	65.8	41.5	21.7	49.1	29.5	15.0	48.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	13.5	57.0	37.5	24.0	45.5	25.0	17.3	44.2
Max Q Clear Time (g_c+I1), s	8.5	8.7	36.9	14.3	44.3	27.0	10.5	14.8
Green Ext Time (p_c), s	0.1	5.6	0.1	2.9	0.3	0.0	0.1	4.5

Intersection Summary	
HCM 2010 Ctrl Delay	68.7
HCM 2010 LOS	E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1535	319	627	1121	243	627
Future Volume (vph)	1535	319	627	1121	243	627
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5	4.5	4.5	4.5
Lane Util. Factor	0.91		1.00	0.91	1.00	0.88
Frt	0.97		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	4954		1770	5085	1770	2787
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	4954		1770	5085	1770	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1616	336	660	1180	256	660
RTOR Reduction (vph)	23	0	0	0	0	502
Lane Group Flow (vph)	1929	0	660	1180	256	158
Turn Type	NA		Prot	NA	Perm	Perm
Protected Phases	4		3	8		
Permitted Phases					2	2
Actuated Green, G (s)	47.5		45.5	97.5	33.5	33.5
Effective Green, g (s)	47.5		45.5	97.5	33.5	33.5
Actuated g/C Ratio	0.34		0.32	0.70	0.24	0.24
Clearance Time (s)	4.5		4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1680		575	3541	423	666
v/s Ratio Prot	c0.39		c0.37	0.23		
v/s Ratio Perm					c0.14	0.06
v/c Ratio	1.15		1.15	0.33	0.61	0.24
Uniform Delay, d1	46.2		47.2	8.4	47.4	42.9
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	74.1		85.4	0.1	6.3	0.8
Delay (s)	120.4		132.7	8.5	53.7	43.8
Level of Service	F		F	A	D	D
Approach Delay (s)	120.4			53.0	46.5	
Approach LOS	F			D	D	

Intersection Summary			
HCM 2000 Control Delay	79.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	96.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	759	742	220	627	241	154	535	144	688	1141	49
Future Volume (veh/h)	26	759	742	220	627	241	154	535	144	688	1141	49
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	29	834	815	242	689	265	169	588	158	756	1254	54
Adj No. of Lanes	1	3	0	1	2	1	2	3	1	1	3	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	43	957	447	158	1229	550	219	1289	401	437	2181	94
Arrive On Green	0.02	0.28	0.28	0.09	0.35	0.35	0.06	0.25	0.25	0.25	0.44	0.44
Sat Flow, veh/h	1774	3390	1583	1774	3539	1583	3442	5085	1583	1774	5000	215
Grp Volume(v), veh/h	29	834	815	242	689	265	169	588	158	756	850	458
Grp Sat Flow(s),veh/h/ln	1774	1695	1583	1774	1770	1583	1721	1695	1583	1774	1695	1825
Q Serve(g_s), s	2.3	32.8	39.5	12.5	22.1	18.4	6.8	13.7	11.6	34.5	26.4	26.4
Cycle Q Clear(g_c), s	2.3	32.8	39.5	12.5	22.1	18.4	6.8	13.7	11.6	34.5	26.4	26.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.12
Lane Grp Cap(c), veh/h	43	957	447	158	1229	550	219	1289	401	437	1479	796
V/C Ratio(X)	0.68	0.87	1.82	1.53	0.56	0.48	0.77	0.46	0.39	1.73	0.57	0.57
Avail Cap(c_a), veh/h	82	957	447	158	1229	550	302	1289	401	437	1479	796
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	67.8	47.8	50.3	63.8	37.0	35.8	64.5	44.1	43.3	52.8	29.7	29.7
Incr Delay (d2), s/veh	17.0	8.9	379.7	266.8	0.6	0.7	7.9	1.2	2.9	337.7	1.6	3.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	16.5	64.4	17.9	10.9	8.2	3.5	6.6	5.4	57.9	12.7	14.0
LnGrp Delay(d),s/veh	84.8	56.7	429.9	330.5	37.6	36.5	72.4	45.3	46.2	390.4	31.3	32.7
LnGrp LOS	F	E	F	F	D	D	E	D	D	F	C	C
Approach Vol, veh/h		1678			1196			915			2064	
Approach Delay, s/veh		238.5			96.6			50.4			163.2	
Approach LOS		F			F			D			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	39.0	40.0	17.0	44.0	13.4	65.6	7.9	53.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	34.5	35.5	12.5	39.5	12.3	57.7	6.5	45.5
Max Q Clear Time (g_c+I1), s	36.5	15.7	14.5	41.5	8.8	28.4	4.3	24.1
Green Ext Time (p_c), s	0.0	13.5	0.0	0.0	0.2	17.5	0.0	17.6

Intersection Summary	
HCM 2010 Ctrl Delay	153.5
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	996	740	190	297	925	243	308	867	148	187	1710	1238
Future Volume (veh/h)	996	740	190	297	925	243	308	867	148	187	1710	1238
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	1027	763	196	306	954	251	318	894	153	193	1763	1276
Adj No. of Lanes	2	3	1	2	3	0	2	3	1	2	3	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	479	1552	483	360	1085	285	199	2023	630	242	2086	650
Arrive On Green	0.14	0.31	0.31	0.10	0.27	0.27	0.06	0.40	0.40	0.07	0.41	0.41
Sat Flow, veh/h	3442	5085	1583	3442	4014	1053	3442	5085	1583	3442	5085	1583
Grp Volume(v), veh/h	1027	763	196	306	805	400	318	894	153	193	1763	1276
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1695	1677	1721	1695	1583	1721	1695	1583
Q Serve(g_s), s	20.5	18.1	14.5	12.9	33.5	33.6	8.5	18.9	9.5	8.1	46.1	60.4
Cycle Q Clear(g_c), s	20.5	18.1	14.5	12.9	33.5	33.6	8.5	18.9	9.5	8.1	46.1	60.4
Prop In Lane	1.00		1.00	1.00		0.63	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	479	1552	483	360	917	453	199	2023	630	242	2086	650
V/C Ratio(X)	2.14	0.49	0.41	0.85	0.88	0.88	1.60	0.44	0.24	0.80	0.84	1.96
Avail Cap(c_a), veh/h	479	1552	483	477	981	485	199	2023	630	332	2086	650
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	63.4	41.8	40.6	64.8	51.4	51.4	69.4	32.4	29.6	67.4	39.2	43.4
Incr Delay (d2), s/veh	521.2	0.2	0.5	10.8	8.8	16.3	292.4	0.7	0.9	9.2	4.4	439.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	44.4	8.5	6.4	6.7	16.8	17.6	12.1	9.0	4.3	4.2	22.4	105.6
LnGrp Delay(d),s/veh	584.6	42.1	41.1	75.5	60.2	67.7	361.8	33.1	30.5	76.6	43.6	482.9
LnGrp LOS	F	D	D	E	E	E	F	C	C	E	D	F
Approach Vol, veh/h		1986			1511			1365			3232	
Approach Delay, s/veh		322.5			65.3			109.4			219.0	
Approach LOS		F			E			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.8	63.1	19.9	49.4	13.0	64.9	25.0	44.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	14.2	54.7	20.4	42.7	8.5	60.4	20.5	42.6
Max Q Clear Time (g_c+I1), s	10.1	20.9	14.9	20.1	10.5	62.4	22.5	35.6
Green Ext Time (p_c), s	0.2	32.0	0.5	15.5	0.0	0.0	0.0	4.2

Intersection Summary	
HCM 2010 Ctrl Delay	197.2
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	126	910	82	249	1034	203	93	143	189	727	831	195
Future Volume (veh/h)	126	910	82	249	1034	203	93	143	189	727	831	195
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	137	989	89	271	1124	221	101	155	205	790	903	212
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	2	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	112	843	76	195	896	175	89	474	424	846	676	159
Arrive On Green	0.06	0.26	0.26	0.11	0.30	0.30	0.05	0.27	0.27	0.25	0.46	0.46
Sat Flow, veh/h	1774	3285	296	1774	2953	578	1774	1770	1583	3442	1460	343
Grp Volume(v), veh/h	137	533	545	271	671	674	101	155	205	790	0	1115
Grp Sat Flow(s),veh/h/ln	1774	1770	1811	1774	1770	1761	1774	1770	1583	1721	0	1802
Q Serve(g_s), s	9.5	38.5	38.5	16.5	45.5	45.5	7.5	10.5	16.3	33.7	0.0	69.5
Cycle Q Clear(g_c), s	9.5	38.5	38.5	16.5	45.5	45.5	7.5	10.5	16.3	33.7	0.0	69.5
Prop In Lane	1.00		0.16	1.00		0.33	1.00		1.00	1.00		0.19
Lane Grp Cap(c), veh/h	112	454	465	195	537	534	89	474	424	846	0	835
V/C Ratio(X)	1.22	1.17	1.17	1.39	1.25	1.26	1.14	0.33	0.48	0.93	0.00	1.34
Avail Cap(c_a), veh/h	112	454	465	195	537	534	89	474	424	897	0	835
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	70.3	55.8	55.8	66.8	52.2	52.3	71.3	44.1	46.2	55.4	0.0	40.3
Incr Delay (d2), s/veh	155.3	99.0	98.7	203.3	127.7	132.0	137.8	1.8	3.9	16.0	0.0	159.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.5	31.3	32.0	19.1	41.3	41.7	7.1	5.4	7.6	17.9	0.0	71.4
LnGrp Delay(d),s/veh	225.6	154.7	154.5	270.0	180.0	184.2	209.1	45.9	50.1	71.3	0.0	199.3
LnGrp LOS	F	F	F	F	F	F	F	D	D	E		F
Approach Vol, veh/h		1215			1616			461			1905	
Approach Delay, s/veh		162.6			196.8			83.5			146.2	
Approach LOS		F			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	41.4	44.6	21.0	43.0	12.0	74.0	14.0	50.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	39.1	37.9	16.5	38.5	7.5	69.5	9.5	45.5
Max Q Clear Time (g_c+I1), s	35.7	18.3	18.5	40.5	9.5	71.5	11.5	47.5
Green Ext Time (p_c), s	1.1	12.1	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	160.2
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1565	396	342	1006	0	0	0	0	159	5	796
Future Volume (vph)	0	1565	396	342	1006	0	0	0	0	159	5	796
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5					4.5	4.5	4.5
Lane Util. Factor		0.95	1.00	0.97	0.95					0.95	0.91	0.95
Frt		1.00	0.85	1.00	1.00					1.00	0.86	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	1.00	1.00
Satd. Flow (prot)		3539	1583	3433	3539					1681	1451	1504
Flt Permitted		1.00	1.00	0.95	1.00					0.95	1.00	1.00
Satd. Flow (perm)		3539	1583	3433	3539					1681	1451	1504
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	1613	408	353	1037	0	0	0	0	164	5	821
RTOR Reduction (vph)	0	0	83	0	0	0	0	0	0	0	96	96
Lane Group Flow (vph)	0	1613	325	353	1037	0	0	0	0	148	327	323
Turn Type		NA	Perm	Prot	NA					Prot	NA	Perm
Protected Phases		4		3	8					1	6	
Permitted Phases			4									6
Actuated Green, G (s)		48.5	48.5	11.6	64.6					26.4	26.4	26.4
Effective Green, g (s)		48.5	48.5	11.6	64.6					26.4	26.4	26.4
Actuated g/C Ratio		0.48	0.48	0.12	0.65					0.26	0.26	0.26
Clearance Time (s)		4.5	4.5	4.5	4.5					4.5	4.5	4.5
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Lane Grp Cap (vph)		1716	767	398	2286					443	383	397
v/s Ratio Prot		c0.46		c0.10	0.29					0.09	c0.23	
v/s Ratio Perm			0.21									0.21
v/c Ratio		0.94	0.42	0.89	0.45					0.33	0.85	0.81
Uniform Delay, d1		24.4	16.7	43.6	8.9					29.7	35.0	34.5
Progression Factor		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Incremental Delay, d2		10.5	0.4	20.4	0.1					0.4	16.5	16.4
Delay (s)		34.9	17.1	64.0	9.0					30.2	51.5	50.9
Level of Service		C	B	E	A					C	D	D
Approach Delay (s)		31.3			23.0			0.0			48.1	
Approach LOS		C			C			A			D	

Intersection Summary			
HCM 2000 Control Delay	32.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	77.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	1585	51	190	2071	269	76	63	59	462	443	155
Future Volume (veh/h)	65	1585	51	190	2071	269	76	63	59	462	443	155
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	69	1686	54	202	2203	286	81	67	63	491	471	165
Adj No. of Lanes	1	3	0	1	3	0	1	2	1	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	65	1596	51	198	1782	227	101	861	385	373	1022	356
Arrive On Green	0.04	0.32	0.32	0.11	0.39	0.39	0.06	0.24	0.24	0.21	0.40	0.40
Sat Flow, veh/h	1774	5062	162	1774	4569	581	1774	3539	1583	1774	2577	897
Grp Volume(v), veh/h	69	1129	611	202	1623	866	81	67	63	491	322	314
Grp Sat Flow(s),veh/h/ln	1774	1695	1834	1774	1695	1760	1774	1770	1583	1774	1770	1705
Q Serve(g_s), s	5.5	47.3	47.3	16.7	58.5	58.5	6.8	2.2	4.7	31.5	20.2	20.4
Cycle Q Clear(g_c), s	5.5	47.3	47.3	16.7	58.5	58.5	6.8	2.2	4.7	31.5	20.2	20.4
Prop In Lane	1.00		0.09	1.00		0.33	1.00		1.00	1.00		0.53
Lane Grp Cap(c), veh/h	65	1069	578	198	1322	686	101	861	385	373	702	676
V/C Ratio(X)	1.06	1.06	1.06	1.02	1.23	1.26	0.80	0.08	0.16	1.32	0.46	0.46
Avail Cap(c_a), veh/h	65	1069	578	198	1322	686	158	861	385	373	702	676
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	72.3	51.3	51.4	66.7	45.7	45.8	69.9	43.8	44.7	59.3	33.4	33.5
Incr Delay (d2), s/veh	129.4	43.6	53.3	70.1	109.2	129.4	14.6	0.2	0.9	160.9	2.2	2.3
Initial Q Delay(d3),s/veh	1.6	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.0	28.6	32.5	12.0	47.4	53.1	3.7	1.1	2.2	32.1	10.3	10.0
LnGrp Delay(d),s/veh	203.2	94.9	104.6	136.9	154.9	175.1	84.5	43.9	45.6	220.1	35.6	35.8
LnGrp LOS	F	F	F	F	F	F	F	D	D	F	D	D
Approach Vol, veh/h		1809			2691			211			1127	
Approach Delay, s/veh		102.3			160.1			60.0			116.0	
Approach LOS		F			F			E			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	36.0	41.0	21.2	51.8	13.0	64.0	10.0	63.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	31.5	36.5	16.7	47.3	13.4	54.6	5.5	58.5
Max Q Clear Time (g_c+I1), s	33.5	6.7	18.7	49.3	8.8	22.4	7.5	60.5
Green Ext Time (p_c), s	0.0	5.1	0.0	0.0	0.1	5.2	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	130.1
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	51	666	104	376	749	107	115	44	926	219	89	158
Future Volume (veh/h)	51	666	104	376	749	107	115	44	926	219	89	158
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	54	709	111	400	797	114	122	47	985	233	95	168
Adj No. of Lanes	1	3	0	1	3	0	1	2	0	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	70	991	154	323	1645	234	523	841	752	64	841	752
Arrive On Green	0.04	0.22	0.22	0.18	0.37	0.37	0.48	0.48	0.48	0.48	0.48	0.48
Sat Flow, veh/h	1774	4443	689	1774	4500	640	1112	1770	1583	544	1770	1583
Grp Volume(v), veh/h	54	539	281	400	599	312	122	47	985	233	95	168
Grp Sat Flow(s),veh/h/ln	1774	1695	1741	1774	1695	1750	1112	1770	1583	544	1770	1583
Q Serve(g_s), s	3.4	16.6	16.8	20.5	15.3	15.5	8.2	1.6	53.5	0.0	3.4	7.0
Cycle Q Clear(g_c), s	3.4	16.6	16.8	20.5	15.3	15.5	15.2	1.6	53.5	53.5	3.4	7.0
Prop In Lane	1.00		0.40	1.00		0.37	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	70	756	388	323	1240	640	523	841	752	64	841	752
V/C Ratio(X)	0.77	0.71	0.72	1.24	0.48	0.49	0.23	0.06	1.31	3.64	0.11	0.22
Avail Cap(c_a), veh/h	225	978	502	323	1240	640	523	841	752	64	841	752
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.6	40.4	40.5	46.1	27.5	27.6	21.8	15.9	29.6	56.3	16.4	17.4
Incr Delay (d2), s/veh	16.2	1.7	3.6	131.1	0.3	0.6	1.0	0.1	148.8	1227.6	0.3	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	7.9	8.5	21.7	7.2	7.6	2.7	0.8	54.3	23.8	1.7	3.2
LnGrp Delay(d),s/veh	69.8	42.2	44.1	177.2	27.8	28.2	22.9	16.1	178.3	1283.9	16.7	18.0
LnGrp LOS	E	D	D	F	C	C	C	B	F	F	B	B
Approach Vol, veh/h		874			1311			1154			496	
Approach Delay, s/veh		44.5			73.5			155.3			612.4	
Approach LOS		D			E			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		58.0	25.0	29.6		58.0	8.9	45.7
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		53.5	20.5	32.5		53.5	14.3	38.7
Max Q Clear Time (g_c+I1), s		55.5	22.5	18.8		55.5	5.4	17.5
Green Ext Time (p_c), s		0.0	0.0	6.3		0.0	0.1	12.2

Intersection Summary	
HCM 2010 Ctrl Delay	161.2
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	286	203	43	313	14	220	60	23	27	99	10
Future Volume (veh/h)	17	286	203	43	313	14	220	60	23	27	99	10
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	18	304	216	46	333	15	234	64	24	29	105	11
Adj No. of Lanes	1	3	1	1	3	0	2	2	0	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	40	1459	454	88	1565	70	412	522	186	61	383	40
Arrive On Green	0.02	0.29	0.29	0.05	0.31	0.31	0.12	0.20	0.20	0.03	0.12	0.12
Sat Flow, veh/h	1774	5085	1583	1774	4991	223	3442	2559	912	1774	3239	335
Grp Volume(v), veh/h	18	304	216	46	225	123	234	43	45	29	57	59
Grp Sat Flow(s),veh/h/ln	1774	1695	1583	1774	1695	1823	1721	1770	1702	1774	1770	1804
Q Serve(g_s), s	0.4	1.9	4.8	1.1	2.1	2.1	2.7	0.8	0.9	0.7	1.2	1.3
Cycle Q Clear(g_c), s	0.4	1.9	4.8	1.1	2.1	2.1	2.7	0.8	0.9	0.7	1.2	1.3
Prop In Lane	1.00		1.00	1.00		0.12	1.00		0.54	1.00		0.19
Lane Grp Cap(c), veh/h	40	1459	454	88	1063	572	412	361	347	61	209	213
V/C Ratio(X)	0.45	0.21	0.48	0.53	0.21	0.21	0.57	0.12	0.13	0.48	0.27	0.28
Avail Cap(c_a), veh/h	399	3909	1217	566	2927	1574	1750	1904	1831	441	1444	1472
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.4	11.4	12.5	19.6	10.7	10.7	17.6	13.7	13.8	20.1	17.0	17.0
Incr Delay (d2), s/veh	7.7	0.1	0.8	4.8	0.1	0.2	1.2	0.1	0.2	5.8	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.9	2.1	0.6	1.0	1.1	1.3	0.4	0.4	0.4	0.6	0.7
LnGrp Delay(d),s/veh	28.1	11.5	13.2	24.4	10.8	10.9	18.8	13.9	13.9	25.8	17.7	17.7
LnGrp LOS	C	B	B	C	B	B	B	B	B	C	B	B
Approach Vol, veh/h		538			394			322			145	
Approach Delay, s/veh		12.8			12.4			17.5			19.3	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.9	13.1	6.6	16.6	9.6	9.5	5.5	17.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	45.5	13.5	32.5	21.5	34.5	9.5	36.5
Max Q Clear Time (g_c+I1), s	2.7	2.9	3.1	6.8	4.7	3.3	2.4	4.1
Green Ext Time (p_c), s	0.0	1.2	0.0	5.4	0.7	1.2	0.0	5.6

Intersection Summary	
HCM 2010 Ctrl Delay	14.4
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	566	1896	209	176	1388	15	55	10	192	10	38	27
Future Volume (veh/h)	566	1896	209	176	1388	15	55	10	192	10	38	27
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	590	1975	218	183	1446	16	57	10	200	10	40	28
Adj No. of Lanes	1	3	0	1	3	1	1	1	0	1	1	2
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	579	2283	250	204	1420	442	73	20	398	20	432	647
Arrive On Green	0.33	0.49	0.49	0.12	0.28	0.28	0.04	0.26	0.26	0.01	0.23	0.23
Sat Flow, veh/h	1774	4654	509	1774	5085	1583	1774	76	1519	1774	1863	2787
Grp Volume(v), veh/h	590	1434	759	183	1446	16	57	0	210	10	40	28
Grp Sat Flow(s),veh/h/ln	1774	1695	1773	1774	1695	1583	1774	0	1595	1774	1863	1393
Q Serve(g_s), s	48.5	55.5	56.7	15.1	41.5	1.1	4.7	0.0	16.6	0.8	2.5	1.2
Cycle Q Clear(g_c), s	48.5	55.5	56.7	15.1	41.5	1.1	4.7	0.0	16.6	0.8	2.5	1.2
Prop In Lane	1.00		0.29	1.00		1.00	1.00		0.95	1.00		1.00
Lane Grp Cap(c), veh/h	579	1663	870	204	1420	442	73	0	418	20	432	647
V/C Ratio(X)	1.02	0.86	0.87	0.90	1.02	0.04	0.78	0.00	0.50	0.50	0.09	0.04
Avail Cap(c_a), veh/h	579	1663	870	204	1420	442	90	0	418	60	432	647
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.0	33.4	33.7	64.9	53.5	39.0	70.6	0.0	46.6	73.0	44.8	44.2
Incr Delay (d2), s/veh	42.3	4.9	9.7	36.0	28.5	0.0	29.5	0.0	4.3	17.6	0.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	30.4	27.0	30.0	9.5	23.1	0.5	2.9	0.0	7.8	0.5	1.3	0.5
LnGrp Delay(d),s/veh	92.3	38.3	43.4	100.9	82.1	39.0	100.1	0.0	50.9	90.6	45.2	44.4
LnGrp LOS	F	D	D	F	F	D	F		D	F	D	D
Approach Vol, veh/h		2783			1645			267			78	
Approach Delay, s/veh		51.2			83.7			61.4			50.7	
Approach LOS		D			F			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.2	43.4	21.6	77.4	10.6	39.0	53.0	46.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	37.0	17.1	72.9	7.5	34.5	48.5	41.5
Max Q Clear Time (g_c+I1), s	2.8	18.6	17.1	58.7	6.7	4.5	50.5	43.5
Green Ext Time (p_c), s	0.0	1.5	0.0	13.8	0.0	1.8	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	63.0
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	2426	759	0	1739	291	489	0	674	0	0	0
Future Volume (veh/h)	0	2426	759	0	1739	291	489	0	674	0	0	0
Number	7	4	14	3	8	18	5	2	12			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	0	1863	1863	0	1863	1863	1900	1863	1863			
Adj Flow Rate, veh/h	0	2923	0	0	2095	0	589	167	700			
Adj No. of Lanes	0	3	1	0	3	1	0	1	1			
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83			
Percent Heavy Veh, %	0	2	2	0	2	2	2	2	2			
Cap, veh/h	0	2619	815	0	2619	815	552	156	625			
Arrive On Green	0.00	0.51	0.00	0.00	0.51	0.00	0.40	0.40	0.40			
Sat Flow, veh/h	0	5253	1583	0	5253	1583	1397	396	1583			
Grp Volume(v), veh/h	0	2923	0	0	2095	0	756	0	700			
Grp Sat Flow(s),veh/h/ln	0	1695	1583	0	1695	1583	1793	0	1583			
Q Serve(g_s), s	0.0	51.5	0.0	0.0	34.0	0.0	39.5	0.0	39.5			
Cycle Q Clear(g_c), s	0.0	51.5	0.0	0.0	34.0	0.0	39.5	0.0	39.5			
Prop In Lane	0.00		1.00	0.00		1.00	0.78		1.00			
Lane Grp Cap(c), veh/h	0	2619	815	0	2619	815	708	0	625			
V/C Ratio(X)	0.00	1.12	0.00	0.00	0.80	0.00	1.07	0.00	1.12			
Avail Cap(c_a), veh/h	0	2619	815	0	2619	815	708	0	625			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	24.2	0.0	0.0	20.0	0.0	30.3	0.0	30.3			
Incr Delay (d2), s/veh	0.0	58.2	0.0	0.0	1.8	0.0	53.3	0.0	73.4			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	37.9	0.0	0.0	16.2	0.0	30.0	0.0	30.0			
LnGrp Delay(d),s/veh	0.0	82.4	0.0	0.0	21.8	0.0	83.5	0.0	103.7			
LnGrp LOS		F			C		F		F			
Approach Vol, veh/h		2923			2095			1456				
Approach Delay, s/veh		82.4			21.8			93.2				
Approach LOS		F			C			F				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		44.0		56.0				56.0
Change Period (Y+Rc), s		4.5		4.5				4.5
Max Green Setting (Gmax), s		39.5		51.5				51.5
Max Q Clear Time (g_c+I1), s		41.5		53.5				36.0
Green Ext Time (p_c), s		0.0		0.0				15.5

Intersection Summary	
HCM 2010 Ctrl Delay	65.3
HCM 2010 LOS	E

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	287	1095	187	286	968	357	132	311	277	248	550	374
Future Volume (veh/h)	287	1095	187	286	968	357	132	311	277	248	550	374
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	334	1273	217	333	1126	415	153	362	322	288	640	435
Adj No. of Lanes	2	3	1	2	3	1	2	2	1	2	2	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	396	1507	469	387	1494	465	201	1288	576	344	819	556
Arrive On Green	0.12	0.30	0.30	0.11	0.29	0.29	0.06	0.36	0.36	0.10	0.41	0.41
Sat Flow, veh/h	3442	5085	1583	3442	5085	1583	3442	3539	1583	3442	2020	1371
Grp Volume(v), veh/h	334	1273	217	333	1126	415	153	362	322	288	561	514
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1695	1583	1721	1770	1583	1721	1770	1621
Q Serve(g_s), s	13.4	33.2	15.8	13.4	28.4	35.5	6.2	10.2	22.9	11.6	39.0	39.1
Cycle Q Clear(g_c), s	13.4	33.2	15.8	13.4	28.4	35.5	6.2	10.2	22.9	11.6	39.0	39.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.85
Lane Grp Cap(c), veh/h	396	1507	469	387	1494	465	201	1288	576	344	717	657
V/C Ratio(X)	0.84	0.84	0.46	0.86	0.75	0.89	0.76	0.28	0.56	0.84	0.78	0.78
Avail Cap(c_a), veh/h	601	1608	501	475	1494	465	256	1288	576	475	717	657
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	61.3	46.7	40.6	61.6	45.3	47.8	65.6	31.8	35.9	62.5	36.6	36.6
Incr Delay (d2), s/veh	6.8	4.1	0.7	12.6	2.2	19.1	9.6	0.5	3.9	9.2	8.3	9.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.8	16.1	7.0	7.1	13.7	18.0	3.2	5.1	10.6	6.0	20.7	19.1
LnGrp Delay(d),s/veh	68.1	50.8	41.3	74.3	47.5	66.9	75.2	32.4	39.8	71.7	44.9	45.6
LnGrp LOS	E	D	D	E	D	E	E	C	D	E	D	D
Approach Vol, veh/h		1824			1874			837			1363	
Approach Delay, s/veh		52.8			56.6			43.1			50.8	
Approach LOS		D			E			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.6	55.9	20.4	46.4	12.8	61.8	20.8	46.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	19.5	48.3	19.5	44.7	10.5	57.3	24.7	39.5
Max Q Clear Time (g_c+I1), s	13.6	24.9	15.4	35.2	8.2	41.1	15.4	37.5
Green Ext Time (p_c), s	0.5	12.4	0.5	6.7	0.1	9.9	0.8	2.0

Intersection Summary	
HCM 2010 Ctrl Delay	52.2
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	159	131	258	209	225	126	578	72	269	1326	49
Future Volume (veh/h)	39	159	131	258	209	225	126	578	72	269	1326	49
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	40	164	135	266	215	232	130	596	74	277	1367	51
Adj No. of Lanes	1	2	0	1	2	1	2	3	1	2	3	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	62	296	229	303	1031	461	197	1900	592	350	2126	662
Arrive On Green	0.04	0.16	0.16	0.17	0.29	0.29	0.06	0.37	0.37	0.10	0.42	0.42
Sat Flow, veh/h	1774	1903	1470	1774	3539	1583	3442	5085	1583	3442	5085	1583
Grp Volume(v), veh/h	40	152	147	266	215	232	130	596	74	277	1367	51
Grp Sat Flow(s),veh/h/ln	1774	1770	1603	1774	1770	1583	1721	1695	1583	1721	1695	1583
Q Serve(g_s), s	2.0	7.2	7.7	13.3	4.2	11.0	3.4	7.5	2.8	7.1	19.4	1.8
Cycle Q Clear(g_c), s	2.0	7.2	7.7	13.3	4.2	11.0	3.4	7.5	2.8	7.1	19.4	1.8
Prop In Lane	1.00		0.92	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	62	275	250	303	1031	461	197	1900	592	350	2126	662
V/C Ratio(X)	0.64	0.55	0.59	0.88	0.21	0.50	0.66	0.31	0.13	0.79	0.64	0.08
Avail Cap(c_a), veh/h	137	778	705	354	1990	890	258	1900	592	383	2126	662
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.2	35.4	35.6	36.7	24.3	26.7	41.9	20.2	18.7	39.8	21.0	15.9
Incr Delay (d2), s/veh	10.6	1.7	2.2	19.4	0.1	0.9	3.8	0.4	0.4	10.0	1.5	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	3.6	3.6	8.1	2.0	4.9	1.7	3.6	1.3	3.9	9.3	0.8
LnGrp Delay(d),s/veh	53.8	37.1	37.8	56.1	24.4	27.6	45.7	20.6	19.1	49.8	22.5	16.1
LnGrp LOS	D	D	D	E	C	C	D	C	B	D	C	B
Approach Vol, veh/h		339			713			800			1695	
Approach Delay, s/veh		39.4			37.3			24.5			26.8	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.7	38.4	20.0	18.6	9.7	42.4	7.7	30.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.1	33.9	18.1	39.9	6.8	37.2	7.0	51.0
Max Q Clear Time (g_c+I1), s	9.1	9.5	15.3	9.7	5.4	21.4	4.0	13.0
Green Ext Time (p_c), s	0.1	16.4	0.2	4.4	0.0	11.8	0.0	4.5

Intersection Summary	
HCM 2010 Ctrl Delay	29.6
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	10	74	10	10	10	56	473	10	10	709	170
Future Volume (veh/h)	110	10	74	10	10	10	56	473	10	10	709	170
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	121	11	81	11	11	11	62	520	11	11	779	187
Adj No. of Lanes	1	2	0	1	2	1	1	2	1	1	2	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	173	262	234	24	228	102	88	2024	905	24	1518	364
Arrive On Green	0.10	0.15	0.15	0.01	0.06	0.06	0.05	0.57	0.57	0.01	0.54	0.54
Sat Flow, veh/h	1774	1770	1583	1774	3539	1583	1774	3539	1583	1774	2832	680
Grp Volume(v), veh/h	121	11	81	11	11	11	62	520	11	11	487	479
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	1770	1583	1774	1770	1743
Q Serve(g_s), s	4.7	0.4	3.3	0.4	0.2	0.5	2.4	5.2	0.2	0.4	12.5	12.5
Cycle Q Clear(g_c), s	4.7	0.4	3.3	0.4	0.2	0.5	2.4	5.2	0.2	0.4	12.5	12.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.39
Lane Grp Cap(c), veh/h	173	262	234	24	228	102	88	2024	905	24	948	934
V/C Ratio(X)	0.70	0.04	0.35	0.45	0.05	0.11	0.70	0.26	0.01	0.45	0.51	0.51
Avail Cap(c_a), veh/h	775	773	692	127	254	113	212	2024	905	127	948	934
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.1	26.0	27.2	34.8	31.3	31.4	33.3	7.6	6.6	34.8	10.6	10.6
Incr Delay (d2), s/veh	5.1	0.1	0.9	12.5	0.1	0.5	9.8	0.3	0.0	12.5	2.0	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.2	1.5	0.3	0.1	0.2	1.4	2.6	0.1	0.3	6.6	6.5
LnGrp Delay(d),s/veh	36.2	26.1	28.1	47.3	31.3	31.8	43.1	8.0	6.6	47.3	12.6	12.6
LnGrp LOS	D	C	C	D	C	C	D	A	A	D	B	B
Approach Vol, veh/h		213			33			593			977	
Approach Delay, s/veh		32.6			36.8			11.6			13.0	
Approach LOS		C			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.5	45.2	5.5	15.0	8.0	42.6	11.4	9.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.1	40.7	5.1	31.1	8.5	37.3	31.1	5.1
Max Q Clear Time (g_c+I1), s	2.4	7.2	2.4	5.3	4.4	14.5	6.7	2.5
Green Ext Time (p_c), s	0.0	13.0	0.0	0.6	0.0	11.0	0.3	0.1

Intersection Summary	
HCM 2010 Ctrl Delay	15.3
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	10	157	28	15	10	176	330	16	10	786	652
Future Volume (veh/h)	160	10	157	28	15	10	176	330	16	10	786	652
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	174	11	171	30	16	11	191	359	17	11	854	709
Adj No. of Lanes	1	1	1	1	2	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	213	278	236	53	124	77	232	2044	97	24	1687	755
Arrive On Green	0.12	0.15	0.15	0.03	0.06	0.06	0.13	0.59	0.59	0.01	0.48	0.48
Sat Flow, veh/h	1774	1863	1583	1774	2100	1302	1774	3441	162	1774	3539	1583
Grp Volume(v), veh/h	174	11	171	30	13	14	191	184	192	11	854	709
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1770	1633	1774	1770	1834	1774	1770	1583
Q Serve(g_s), s	8.1	0.4	8.7	1.4	0.6	0.7	8.8	4.0	4.0	0.5	14.0	35.8
Cycle Q Clear(g_c), s	8.1	0.4	8.7	1.4	0.6	0.7	8.8	4.0	4.0	0.5	14.0	35.8
Prop In Lane	1.00		1.00	1.00		0.80	1.00		0.09	1.00		1.00
Lane Grp Cap(c), veh/h	213	278	236	53	105	96	232	1051	1089	24	1687	755
V/C Ratio(X)	0.82	0.04	0.72	0.57	0.13	0.14	0.82	0.18	0.18	0.46	0.51	0.94
Avail Cap(c_a), veh/h	347	897	762	133	638	589	389	1051	1089	105	1687	755
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.2	30.7	34.2	40.4	37.6	37.7	35.7	7.8	7.8	41.3	15.2	20.9
Incr Delay (d2), s/veh	7.5	0.1	4.2	9.1	0.5	0.7	7.2	0.4	0.4	13.2	1.1	20.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.4	0.2	4.1	0.8	0.3	0.3	4.8	2.0	2.1	0.3	7.0	19.8
LnGrp Delay(d),s/veh	43.7	30.8	38.4	49.5	38.2	38.3	42.9	8.1	8.1	54.5	16.3	41.8
LnGrp LOS	D	C	D	D	D	D	D	A	A	D	B	D
Approach Vol, veh/h		356			57			567			1574	
Approach Delay, s/veh		40.8			44.2			19.8			28.1	
Approach LOS		D			D			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.6	54.6	7.0	17.1	15.5	44.7	14.6	9.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	50.1	6.3	40.6	18.5	36.6	16.5	30.4
Max Q Clear Time (g_c+I1), s	2.5	6.0	3.4	10.7	10.8	37.8	10.1	2.7
Green Ext Time (p_c), s	0.0	17.1	0.0	0.8	0.3	0.0	0.2	0.8

Intersection Summary	
HCM 2010 Ctrl Delay	28.4
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	573	197	17	55	87	63	10	209	36	85	495	238
Future Volume (veh/h)	573	197	17	55	87	63	10	209	36	85	495	238
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	573	197	17	55	87	63	10	209	36	85	495	238
Adj No. of Lanes	1	2	1	1	2	1	1	2	1	1	2	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	644	1465	655	86	351	157	23	708	317	109	881	394
Arrive On Green	0.36	0.41	0.41	0.05	0.10	0.10	0.01	0.20	0.20	0.06	0.25	0.25
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	573	197	17	55	87	63	10	209	36	85	495	238
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	19.8	2.3	0.4	2.0	1.5	2.4	0.4	3.3	1.2	3.1	8.0	8.7
Cycle Q Clear(g_c), s	19.8	2.3	0.4	2.0	1.5	2.4	0.4	3.3	1.2	3.1	8.0	8.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	644	1465	655	86	351	157	23	708	317	109	881	394
V/C Ratio(X)	0.89	0.13	0.03	0.64	0.25	0.40	0.44	0.30	0.11	0.78	0.56	0.60
Avail Cap(c_a), veh/h	1102	3160	1414	253	1466	656	136	1504	673	185	1602	717
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.5	11.9	11.3	30.5	27.1	27.5	31.9	22.2	21.3	30.1	21.4	21.6
Incr Delay (d2), s/veh	5.0	0.0	0.0	7.7	0.4	1.7	13.1	0.2	0.2	11.3	0.6	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.5	1.1	0.2	1.2	0.7	1.1	0.3	1.6	0.5	1.9	3.9	3.9
LnGrp Delay(d),s/veh	24.6	11.9	11.3	38.2	27.5	29.2	45.0	22.4	21.5	41.4	21.9	23.1
LnGrp LOS	C	B	B	D	C	C	D	C	C	D	C	C
Approach Vol, veh/h		787			205			255			818	
Approach Delay, s/veh		21.1			30.9			23.2			24.3	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.5	17.5	7.7	31.5	5.3	20.7	28.2	11.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.8	27.7	9.3	58.2	5.0	29.5	40.5	27.0
Max Q Clear Time (g_c+I1), s	5.1	5.3	4.0	4.3	2.4	10.7	21.8	4.4
Green Ext Time (p_c), s	0.0	5.9	0.0	2.3	0.0	5.6	1.9	2.0

Intersection Summary	
HCM 2010 Ctrl Delay	23.6
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	52	134	10	118	10	382	217	10	10	840	55
Future Volume (veh/h)	16	52	134	10	118	10	382	217	10	10	840	55
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	16	52	134	10	118	10	382	217	10	10	840	55
Adj No. of Lanes	1	2	1	1	2	1	1	2	0	1	2	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	34	458	205	22	435	195	443	2022	93	22	1179	77
Arrive On Green	0.02	0.13	0.13	0.01	0.12	0.12	0.25	0.59	0.59	0.01	0.35	0.35
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1774	3446	158	1774	3373	221
Grp Volume(v), veh/h	16	52	134	10	118	10	382	111	116	10	441	454
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	1770	1835	1774	1770	1824
Q Serve(g_s), s	0.6	0.9	5.6	0.4	2.1	0.4	14.3	1.9	1.9	0.4	15.0	15.0
Cycle Q Clear(g_c), s	0.6	0.9	5.6	0.4	2.1	0.4	14.3	1.9	1.9	0.4	15.0	15.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.09	1.00		0.12
Lane Grp Cap(c), veh/h	34	458	205	22	435	195	443	1038	1077	22	619	638
V/C Ratio(X)	0.47	0.11	0.65	0.45	0.27	0.05	0.86	0.11	0.11	0.45	0.71	0.71
Avail Cap(c_a), veh/h	130	1377	616	127	1372	614	828	1649	1710	127	950	980
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.8	26.8	28.8	34.1	27.7	27.0	25.0	6.3	6.3	34.1	19.6	19.6
Incr Delay (d2), s/veh	9.8	0.1	3.5	13.3	0.3	0.1	5.1	0.0	0.0	13.3	1.5	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.4	2.6	0.3	1.1	0.2	7.6	0.9	1.0	0.3	7.5	7.7
LnGrp Delay(d),s/veh	43.6	26.9	32.3	47.4	28.0	27.1	30.0	6.4	6.4	47.4	21.2	21.1
LnGrp LOS	D	C	C	D	C	C	C	A	A	D	C	C
Approach Vol, veh/h		202			138			609			905	
Approach Delay, s/veh		31.8			29.4			21.2			21.4	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.4	45.4	5.4	13.5	21.9	28.8	5.8	13.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	64.9	5.0	27.1	32.5	37.4	5.1	27.0
Max Q Clear Time (g_c+I1), s	2.4	3.9	2.4	7.6	16.3	17.0	2.6	4.1
Green Ext Time (p_c), s	0.0	9.3	0.0	1.4	1.1	7.3	0.0	1.5

Intersection Summary	
HCM 2010 Ctrl Delay	23.1
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	265	924	132	231	10	800	877	124	10	1635	10
Future Volume (veh/h)	10	265	924	132	231	10	800	877	124	10	1635	10
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	10	265	924	132	231	10	800	877	124	10	1635	10
Adj No. of Lanes	2	2	2	2	2	1	2	3	1	2	3	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	40	687	541	180	831	372	865	3104	966	40	1884	587
Arrive On Green	0.01	0.19	0.19	0.05	0.23	0.23	0.25	0.61	0.61	0.01	0.37	0.37
Sat Flow, veh/h	3442	3539	2787	3442	3539	1583	3442	5085	1583	3442	5085	1583
Grp Volume(v), veh/h	10	265	924	132	231	10	800	877	124	10	1635	10
Grp Sat Flow(s),veh/h/ln	1721	1770	1393	1721	1770	1583	1721	1695	1583	1721	1695	1583
Q Serve(g_s), s	0.4	8.9	26.5	5.2	7.3	0.7	31.0	11.1	4.5	0.4	40.7	0.5
Cycle Q Clear(g_c), s	0.4	8.9	26.5	5.2	7.3	0.7	31.0	11.1	4.5	0.4	40.7	0.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	40	687	541	180	831	372	865	3104	966	40	1884	587
V/C Ratio(X)	0.25	0.39	1.71	0.73	0.28	0.03	0.92	0.28	0.13	0.25	0.87	0.02
Avail Cap(c_a), veh/h	126	687	541	197	831	372	935	3104	966	126	1884	587
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.9	47.9	55.0	63.8	42.8	40.2	49.9	12.5	11.2	66.9	39.9	27.2
Incr Delay (d2), s/veh	3.3	0.4	326.7	12.2	0.2	0.0	14.0	0.2	0.3	3.3	5.7	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	4.4	34.8	2.8	3.6	0.3	16.3	5.3	2.0	0.2	20.1	0.2
LnGrp Delay(d),s/veh	70.2	48.3	381.8	75.9	43.0	40.3	63.9	12.8	11.5	70.2	45.6	27.3
LnGrp LOS	E	D	F	E	D	D	E	B	B	E	D	C
Approach Vol, veh/h		1199			373			1801			1655	
Approach Delay, s/veh		305.5			54.6			35.4			45.6	
Approach LOS		F			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.1	87.8	11.6	31.0	38.8	55.1	6.1	36.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	82.7	7.8	26.5	37.1	50.6	5.0	29.3
Max Q Clear Time (g_c+I1), s	2.4	13.1	7.2	28.5	33.0	42.7	2.4	9.3
Green Ext Time (p_c), s	0.0	42.3	0.0	0.0	1.4	7.2	0.0	7.7

Intersection Summary	
HCM 2010 Ctrl Delay	104.6
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	131	23	376	98	835	19	1546	1067	672	940	14
Future Volume (veh/h)	10	131	23	376	98	835	19	1546	1067	672	940	14
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	11	142	25	409	107	908	21	1680	1160	730	1022	15
Adj No. of Lanes	1	3	0	1	3	1	1	3	2	2	3	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	22	1145	193	292	2102	654	36	1488	815	516	2181	32
Arrive On Green	0.01	0.26	0.26	0.16	0.41	0.41	0.02	0.29	0.29	0.15	0.42	0.42
Sat Flow, veh/h	1774	4384	739	1774	5085	1583	1774	5085	2787	3442	5164	76
Grp Volume(v), veh/h	11	108	59	409	107	908	21	1680	1160	730	671	366
Grp Sat Flow(s),veh/h/ln	1774	1695	1732	1774	1695	1583	1774	1695	1393	1721	1695	1849
Q Serve(g_s), s	0.8	3.3	3.5	22.5	1.7	56.5	1.6	40.0	40.0	20.5	19.5	19.5
Cycle Q Clear(g_c), s	0.8	3.3	3.5	22.5	1.7	56.5	1.6	40.0	40.0	20.5	19.5	19.5
Prop In Lane	1.00		0.43	1.00		1.00	1.00		1.00	1.00		0.04
Lane Grp Cap(c), veh/h	22	886	452	292	2102	654	36	1488	815	516	1432	781
V/C Ratio(X)	0.50	0.12	0.13	1.40	0.05	1.39	0.59	1.13	1.42	1.41	0.47	0.47
Avail Cap(c_a), veh/h	65	967	494	292	2102	654	77	1488	815	516	1432	781
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	67.1	38.5	38.6	57.1	24.0	40.1	66.4	48.4	48.4	58.1	28.4	28.4
Incr Delay (d2), s/veh	16.2	0.1	0.1	199.8	0.0	183.8	14.5	67.2	197.4	197.7	1.1	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	1.6	1.7	27.2	0.8	58.0	0.9	27.9	37.7	23.9	9.4	10.4
LnGrp Delay(d),s/veh	83.2	38.6	38.7	256.9	24.0	223.9	80.9	115.6	245.7	255.8	29.5	30.4
LnGrp LOS	F	D	D	F	C	F	F	F	F	F	C	C
Approach Vol, veh/h		178			1424			2861			1767	
Approach Delay, s/veh		41.4			218.3			168.1			123.2	
Approach LOS		D			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	25.0	44.5	27.0	40.2	7.2	62.3	6.2	61.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	20.5	40.0	22.5	39.0	5.9	54.6	5.0	56.5
Max Q Clear Time (g_c+I1), s	22.5	42.0	24.5	5.5	3.6	21.5	2.8	58.5
Green Ext Time (p_c), s	0.0	0.0	0.0	7.0	0.0	30.4	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	163.2
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	320	1637	83	657	1237	549	194	787	660	614	460	124
Future Volume (veh/h)	320	1637	83	657	1237	549	194	787	660	614	460	124
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	360	1839	93	738	1390	617	218	884	742	690	517	139
Adj No. of Lanes	2	4	0	2	3	1	2	2	2	2	2	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	383	1615	82	585	1604	499	267	1050	827	539	1038	278
Arrive On Green	0.11	0.26	0.26	0.17	0.32	0.32	0.08	0.30	0.30	0.16	0.38	0.38
Sat Flow, veh/h	3442	6294	318	3442	5085	1583	3442	3539	2787	3442	2763	739
Grp Volume(v), veh/h	360	1404	528	738	1390	617	218	884	742	690	330	326
Grp Sat Flow(s),veh/h/ln	1721	1602	1807	1721	1695	1583	1721	1770	1393	1721	1770	1732
Q Serve(g_s), s	15.6	38.5	38.5	25.5	38.6	47.3	9.4	35.1	38.3	23.5	21.5	21.7
Cycle Q Clear(g_c), s	15.6	38.5	38.5	25.5	38.6	47.3	9.4	35.1	38.3	23.5	21.5	21.7
Prop In Lane	1.00		0.18	1.00		1.00	1.00		1.00	1.00		0.43
Lane Grp Cap(c), veh/h	383	1234	464	585	1604	499	267	1050	827	539	665	651
V/C Ratio(X)	0.94	1.14	1.14	1.26	0.87	1.24	0.82	0.84	0.90	1.28	0.50	0.50
Avail Cap(c_a), veh/h	383	1234	464	585	1604	499	356	1050	827	539	665	651
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.1	55.8	55.8	62.3	48.4	51.3	68.1	49.5	50.6	63.3	35.9	36.0
Incr Delay (d2), s/veh	30.9	72.6	85.5	131.0	5.3	122.5	10.5	8.2	14.5	139.6	2.6	2.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.0	25.3	30.2	22.7	18.8	37.6	4.8	18.4	16.4	21.6	10.9	10.9
LnGrp Delay(d),s/veh	97.1	128.3	141.3	193.2	53.7	173.8	78.7	57.6	65.1	202.9	38.6	38.7
LnGrp LOS	F	F	F	F	D	F	E	E	E	F	D	D
Approach Vol, veh/h		2292			2745			1844			1346	
Approach Delay, s/veh		126.4			118.2			63.1			122.8	
Approach LOS		F			F			E			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	28.0	49.0	30.0	43.0	16.1	60.9	21.2	51.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	23.5	44.5	25.5	38.5	15.5	52.5	16.7	47.3
Max Q Clear Time (g_c+I1), s	25.5	40.3	27.5	40.5	11.4	23.7	17.6	49.3
Green Ext Time (p_c), s	0.0	3.7	0.0	0.0	0.3	17.7	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	108.9
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	176	806	169	71	704	105	121	891	154	99	671	71
Future Volume (veh/h)	176	806	169	71	704	105	121	891	154	99	671	71
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	178	814	171	72	711	106	122	900	156	100	678	72
Adj No. of Lanes	2	3	1	2	3	1	1	2	1	1	2	1
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	246	1374	428	146	1225	381	152	1562	699	127	1512	676
Arrive On Green	0.07	0.27	0.27	0.04	0.24	0.24	0.09	0.44	0.44	0.07	0.43	0.43
Sat Flow, veh/h	3442	5085	1583	3442	5085	1583	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	178	814	171	72	711	106	122	900	156	100	678	72
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1695	1583	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	5.2	14.3	9.1	2.1	12.7	5.6	7.0	19.6	6.3	5.7	14.0	2.8
Cycle Q Clear(g_c), s	5.2	14.3	9.1	2.1	12.7	5.6	7.0	19.6	6.3	5.7	14.0	2.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	246	1374	428	146	1225	381	152	1562	699	127	1512	676
V/C Ratio(X)	0.72	0.59	0.40	0.49	0.58	0.28	0.80	0.58	0.22	0.79	0.45	0.11
Avail Cap(c_a), veh/h	384	1751	545	217	1504	468	284	1562	699	250	1512	676
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.9	32.7	30.8	48.3	34.5	31.8	46.3	21.6	17.8	47.1	20.9	17.7
Incr Delay (d2), s/veh	4.0	0.4	0.6	2.6	0.4	0.4	9.4	1.6	0.7	10.2	1.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	6.8	4.0	1.1	6.0	2.5	3.8	9.8	2.9	3.2	7.0	1.3
LnGrp Delay(d),s/veh	50.8	33.1	31.4	50.9	35.0	32.2	55.6	23.1	18.6	57.3	21.9	18.0
LnGrp LOS	D	C	C	D	C	C	E	C	B	E	C	B
Approach Vol, veh/h		1163			889			1178			850	
Approach Delay, s/veh		35.6			35.9			25.9			25.7	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.9	50.0	8.9	32.3	13.3	48.5	11.9	29.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	14.5	45.5	6.5	35.5	16.5	43.5	11.5	30.5
Max Q Clear Time (g_c+I1), s	7.7	21.6	4.1	16.3	9.0	16.0	7.2	14.7
Green Ext Time (p_c), s	0.1	13.5	0.0	11.5	0.2	14.6	0.2	10.1

Intersection Summary	
HCM 2010 Ctrl Delay	30.8
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	203	67	49	10	143	484	77	2901	10	225	2121	115
Future Volume (veh/h)	203	67	49	10	143	484	77	2901	10	225	2121	115
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	221	73	53	11	155	526	84	3153	11	245	2305	125
Adj No. of Lanes	1	3	0	1	3	1	1	3	0	2	3	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	160	1168	545	22	1356	422	89	2441	9	195	2338	126
Arrive On Green	0.09	0.34	0.34	0.01	0.27	0.27	0.05	0.47	0.47	0.06	0.47	0.47
Sat Flow, veh/h	1774	3390	1583	1774	5085	1583	1774	5231	18	3442	4940	266
Grp Volume(v), veh/h	221	73	53	11	155	526	84	2042	1122	245	1576	854
Grp Sat Flow(s),veh/h/ln	1774	1695	1583	1774	1695	1583	1774	1695	1860	1721	1695	1816
Q Serve(g_s), s	13.5	2.2	3.4	0.9	3.5	40.0	7.1	70.0	70.0	8.5	68.6	70.1
Cycle Q Clear(g_c), s	13.5	2.2	3.4	0.9	3.5	40.0	7.1	70.0	70.0	8.5	68.6	70.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.01	1.00		0.15
Lane Grp Cap(c), veh/h	160	1168	545	22	1356	422	89	1582	868	195	1605	859
V/C Ratio(X)	1.38	0.06	0.10	0.51	0.11	1.25	0.95	1.29	1.29	1.26	0.98	0.99
Avail Cap(c_a), veh/h	160	1168	545	71	1356	422	89	1582	868	195	1605	859
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	68.3	32.9	33.4	73.6	41.6	55.0	71.1	40.0	40.0	70.8	38.9	39.3
Incr Delay (d2), s/veh	206.8	0.0	0.1	17.0	0.0	129.1	77.9	135.7	140.4	150.1	18.6	29.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.8	1.0	1.5	0.6	1.6	32.6	5.4	62.6	69.8	8.1	36.1	42.1
LnGrp Delay(d),s/veh	275.1	33.0	33.4	90.6	41.6	184.1	149.0	175.7	180.4	220.8	57.5	68.4
LnGrp LOS	F	C	C	F	D	F	F	F	F	F	E	E
Approach Vol, veh/h		347			692			3248			2675	
Approach Delay, s/veh		187.2			150.7			176.6			75.9	
Approach LOS		F			F			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.0	74.5	6.3	56.2	12.0	75.5	18.0	44.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	8.5	70.0	6.0	47.5	7.5	71.0	13.5	40.0
Max Q Clear Time (g_c+I1), s	10.5	72.0	2.9	5.4	9.1	72.1	15.5	42.0
Green Ext Time (p_c), s	0.0	0.0	0.0	4.3	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	135.9
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	111	453	404	79	580	110	543	401	60	71	266	112
Future Volume (veh/h)	111	453	404	79	580	110	543	401	60	71	266	112
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	118	482	430	84	617	117	578	427	64	76	283	119
Adj No. of Lanes	2	3	1	1	3	1	2	2	1	1	2	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	173	1569	489	107	1619	504	671	1519	680	97	1023	458
Arrive On Green	0.05	0.31	0.31	0.06	0.32	0.32	0.19	0.43	0.43	0.05	0.29	0.29
Sat Flow, veh/h	3442	5085	1583	1774	5085	1583	3442	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	118	482	430	84	617	117	578	427	64	76	283	119
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1774	1695	1583	1721	1770	1583	1774	1770	1583
Q Serve(g_s), s	4.1	8.9	31.5	5.7	11.5	6.7	19.9	9.6	2.9	5.2	7.6	7.1
Cycle Q Clear(g_c), s	4.1	8.9	31.5	5.7	11.5	6.7	19.9	9.6	2.9	5.2	7.6	7.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	173	1569	489	107	1619	504	671	1519	680	97	1023	458
V/C Ratio(X)	0.68	0.31	0.88	0.79	0.38	0.23	0.86	0.28	0.09	0.78	0.28	0.26
Avail Cap(c_a), veh/h	324	1643	511	225	1809	563	1055	1519	680	210	1023	458
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.1	32.3	40.1	56.7	32.3	30.7	47.6	22.6	20.8	57.1	33.6	33.4
Incr Delay (d2), s/veh	4.7	0.1	15.7	12.0	0.1	0.2	4.5	0.5	0.3	12.7	0.7	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	4.2	15.9	3.2	5.4	2.9	9.9	4.8	1.3	2.9	3.8	3.2
LnGrp Delay(d),s/veh	61.8	32.4	55.9	68.7	32.5	30.9	52.2	23.1	21.0	69.8	34.3	34.8
LnGrp LOS	E	C	E	E	C	C	D	C	C	E	C	C
Approach Vol, veh/h		1030			818			1069			478	
Approach Delay, s/veh		45.6			36.0			38.7			40.0	
Approach LOS		D			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.2	57.0	11.9	42.2	28.3	39.9	10.6	43.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	14.5	52.5	15.5	39.5	37.5	29.5	11.5	43.5
Max Q Clear Time (g_c+I1), s	7.2	11.6	7.7	33.5	21.9	9.6	6.1	13.5
Green Ext Time (p_c), s	0.1	6.2	0.1	4.2	2.0	5.3	0.1	12.0

Intersection Summary	
HCM 2010 Ctrl Delay	40.3
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	339	496	403	375	219	115	227	337	385	190	269	171
Future Volume (veh/h)	339	496	403	375	219	115	227	337	385	190	269	171
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	339	496	403	375	219	115	227	337	385	190	269	171
Adj No. of Lanes	1	2	0	1	2	0	1	2	1	1	2	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	368	511	415	400	668	338	251	899	402	213	490	302
Arrive On Green	0.21	0.28	0.28	0.23	0.29	0.29	0.14	0.25	0.25	0.12	0.23	0.23
Sat Flow, veh/h	1774	1858	1508	1774	2277	1152	1774	3539	1583	1774	2106	1297
Grp Volume(v), veh/h	339	472	427	375	168	166	227	337	385	190	225	215
Grp Sat Flow(s),veh/h/ln	1774	1770	1597	1774	1770	1659	1774	1770	1583	1774	1770	1634
Q Serve(g_s), s	26.9	37.9	38.0	29.8	10.7	11.3	18.1	11.3	34.4	15.2	16.0	16.7
Cycle Q Clear(g_c), s	26.9	37.9	38.0	29.8	10.7	11.3	18.1	11.3	34.4	15.2	16.0	16.7
Prop In Lane	1.00		0.94	1.00		0.69	1.00		1.00	1.00		0.79
Lane Grp Cap(c), veh/h	368	487	439	400	519	486	251	899	402	213	412	380
V/C Ratio(X)	0.92	0.97	0.97	0.94	0.32	0.34	0.90	0.37	0.96	0.89	0.55	0.57
Avail Cap(c_a), veh/h	516	487	439	451	519	486	300	899	402	241	412	380
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.8	51.5	51.5	54.6	39.7	39.9	60.7	44.2	52.8	62.3	48.4	48.7
Incr Delay (d2), s/veh	17.8	33.2	35.5	26.0	0.4	0.4	26.0	1.2	35.2	29.0	5.1	6.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.0	23.0	21.0	17.5	5.3	5.2	10.7	5.7	19.0	9.2	8.4	8.2
LnGrp Delay(d),s/veh	73.6	84.7	87.0	80.6	40.0	40.3	86.7	45.4	88.0	91.3	53.5	54.7
LnGrp LOS	E	F	F	F	D	D	F	D	F	F	D	D
Approach Vol, veh/h		1238			709			949			630	
Approach Delay, s/veh		82.4			61.6			72.5			65.3	
Approach LOS		F			E			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.8	41.0	36.9	44.0	24.8	37.9	34.3	46.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	19.5	36.5	36.5	39.5	24.3	31.7	41.8	34.2
Max Q Clear Time (g_c+I1), s	17.2	36.4	31.8	40.0	20.1	18.7	28.9	13.3
Green Ext Time (p_c), s	0.1	0.1	0.5	0.0	0.2	5.3	0.9	8.5

Intersection Summary	
HCM 2010 Ctrl Delay	72.5
HCM 2010 LOS	E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1364	318	807	1619	217	765
Future Volume (vph)	1364	318	807	1619	217	765
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5	4.5	4.5	4.5
Lane Util. Factor	0.91		1.00	0.91	1.00	0.88
Frt	0.97		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	4941		1770	5085	1770	2787
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	4941		1770	5085	1770	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1436	335	849	1704	228	805
RTOR Reduction (vph)	27	0	0	0	0	607
Lane Group Flow (vph)	1744	0	849	1704	228	198
Turn Type	NA		Prot	NA	Perm	Perm
Protected Phases	4		3	8		
Permitted Phases					2	2
Actuated Green, G (s)	41.5		50.5	96.5	34.5	34.5
Effective Green, g (s)	41.5		50.5	96.5	34.5	34.5
Actuated g/C Ratio	0.30		0.36	0.69	0.25	0.25
Clearance Time (s)	4.5		4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1464		638	3505	436	686
v/s Ratio Prot	c0.35		c0.48	0.34		
v/s Ratio Perm					c0.13	0.07
v/c Ratio	1.19		1.33	0.49	0.52	0.29
Uniform Delay, d1	49.2		44.8	10.2	45.6	42.8
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	93.0		159.4	0.1	4.4	1.1
Delay (s)	142.3		204.2	10.3	50.1	43.9
Level of Service	F		F	B	D	D
Approach Delay (s)	142.3			74.8	45.2	
Approach LOS	F			E	D	

Intersection Summary			
HCM 2000 Control Delay	91.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	101.4%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	561	340	185	489	561	724	1194	506	295	855	22
Future Volume (veh/h)	14	561	340	185	489	561	724	1194	506	295	855	22
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	15	616	374	203	537	616	796	1312	556	324	940	24
Adj No. of Lanes	1	3	0	1	2	1	2	3	1	1	3	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	28	919	429	199	1301	582	761	1490	464	342	1350	34
Arrive On Green	0.02	0.27	0.27	0.11	0.37	0.37	0.22	0.29	0.29	0.19	0.26	0.26
Sat Flow, veh/h	1774	3390	1583	1774	3539	1583	3442	5085	1583	1774	5100	130
Grp Volume(v), veh/h	15	616	374	203	537	616	796	1312	556	324	625	339
Grp Sat Flow(s),veh/h/ln	1774	1695	1583	1774	1770	1583	1721	1695	1583	1774	1695	1840
Q Serve(g_s), s	1.2	22.3	31.1	15.5	15.6	50.7	30.5	33.9	40.4	24.9	22.9	22.9
Cycle Q Clear(g_c), s	1.2	22.3	31.1	15.5	15.6	50.7	30.5	33.9	40.4	24.9	22.9	22.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.07
Lane Grp Cap(c), veh/h	28	919	429	199	1301	582	761	1490	464	342	897	487
V/C Ratio(X)	0.53	0.67	0.87	1.02	0.41	1.06	1.05	0.88	1.20	0.95	0.70	0.70
Avail Cap(c_a), veh/h	66	971	454	199	1301	582	761	1490	464	342	897	487
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	67.3	44.8	48.0	61.2	32.5	43.6	53.7	46.4	48.7	54.9	45.7	45.7
Incr Delay (d2), s/veh	14.8	1.7	16.1	68.5	0.2	53.6	45.2	7.8	108.6	34.9	4.4	8.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	10.7	15.5	11.3	7.6	30.9	19.2	17.0	31.6	15.5	11.3	12.8
LnGrp Delay(d),s/veh	82.1	46.4	64.0	129.8	32.7	97.2	98.9	54.2	157.3	89.8	50.1	53.7
LnGrp LOS	F	D	E	F	C	F	F	D	F	F	D	D
Approach Vol, veh/h		1005			1356			2664			1288	
Approach Delay, s/veh		53.5			76.5			89.1			61.1	
Approach LOS		D			E			F			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	31.1	44.9	20.0	41.9	35.0	41.0	6.7	55.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	26.6	40.4	15.5	39.5	30.5	36.5	5.1	49.9
Max Q Clear Time (g_c+I1), s	26.9	42.4	17.5	33.1	32.5	24.9	3.2	52.7
Green Ext Time (p_c), s	0.0	0.0	0.0	4.3	0.0	10.3	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	75.0
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1680	775	192	341	900	291	332	1943	179	238	1166	1254
Future Volume (veh/h)	1680	775	192	341	900	291	332	1943	179	238	1166	1254
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	1732	799	198	352	928	300	342	2003	185	245	1202	1293
Adj No. of Lanes	2	3	1	2	3	0	2	3	1	2	3	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	620	1687	525	408	1029	332	175	1949	607	152	1914	596
Arrive On Green	0.18	0.33	0.33	0.12	0.27	0.27	0.05	0.38	0.38	0.04	0.38	0.38
Sat Flow, veh/h	3442	5085	1583	3442	3808	1228	3442	5085	1583	3442	5085	1583
Grp Volume(v), veh/h	1732	799	198	352	826	402	342	2003	185	245	1202	1293
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1695	1646	1721	1695	1583	1721	1695	1583
Q Serve(g_s), s	26.5	18.3	14.1	14.8	34.6	34.7	7.5	56.4	12.0	6.5	28.4	55.4
Cycle Q Clear(g_c), s	26.5	18.3	14.1	14.8	34.6	34.7	7.5	56.4	12.0	6.5	28.4	55.4
Prop In Lane	1.00		1.00	1.00		0.75	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	620	1687	525	408	916	445	175	1949	607	152	1914	596
V/C Ratio(X)	2.79	0.47	0.38	0.86	0.90	0.90	1.95	1.03	0.30	1.61	0.63	2.17
Avail Cap(c_a), veh/h	620	1687	525	536	981	476	175	1949	607	152	1914	596
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.3	39.0	37.6	63.7	51.8	51.9	69.8	45.4	31.7	70.3	37.5	45.9
Incr Delay (d2), s/veh	812.2	0.2	0.4	10.9	10.8	19.7	447.6	27.9	1.3	303.6	1.6	531.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	82.5	8.6	6.2	7.7	17.6	18.2	14.5	31.4	5.4	9.5	13.5	112.2
LnGrp Delay(d),s/veh	872.6	39.2	38.0	74.6	62.6	71.6	517.5	73.3	33.0	374.0	39.0	577.7
LnGrp LOS	F	D	D	E	E	E	F	F	C	F	D	F
Approach Vol, veh/h		2729			1580			2530			2740	
Approach Delay, s/veh		568.0			67.6			130.4			323.2	
Approach LOS		F			E			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	60.9	22.0	53.3	12.0	59.9	31.0	44.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.5	56.4	22.9	46.2	7.5	55.4	26.5	42.6
Max Q Clear Time (g_c+I1), s	8.5	58.4	16.8	20.3	9.5	57.4	28.5	36.7
Green Ext Time (p_c), s	0.0	0.0	0.7	17.5	0.0	0.0	0.0	3.1

Intersection Summary	
HCM 2010 Ctrl Delay	299.8
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	143	1094	79	151	796	913	187	686	505	539	446	126
Future Volume (veh/h)	143	1094	79	151	796	913	187	686	505	539	446	126
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	155	1189	86	164	865	992	203	746	549	586	485	137
Adj No. of Lanes	1	2	0	1	2	0	1	2	0	2	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	124	1190	86	174	678	607	148	607	441	402	480	136
Arrive On Green	0.07	0.36	0.36	0.10	0.38	0.38	0.08	0.31	0.31	0.12	0.34	0.34
Sat Flow, veh/h	1774	3348	242	1774	1770	1583	1774	1959	1422	3442	1398	395
Grp Volume(v), veh/h	155	628	647	164	865	992	203	673	622	586	0	622
Grp Sat Flow(s),veh/h/ln	1774	1770	1820	1774	1770	1583	1774	1770	1612	1721	0	1793
Q Serve(g_s), s	10.5	53.2	53.3	13.8	57.5	57.5	12.5	46.5	46.5	17.5	0.0	51.5
Cycle Q Clear(g_c), s	10.5	53.2	53.3	13.8	57.5	57.5	12.5	46.5	46.5	17.5	0.0	51.5
Prop In Lane	1.00		0.13	1.00		1.00	1.00		0.88	1.00		0.22
Lane Grp Cap(c), veh/h	124	629	647	174	678	607	148	549	500	402	0	616
V/C Ratio(X)	1.25	1.00	1.00	0.94	1.28	1.63	1.37	1.23	1.25	1.46	0.00	1.01
Avail Cap(c_a), veh/h	124	629	647	174	678	607	148	549	500	402	0	616
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	69.8	48.3	48.4	67.2	46.3	46.3	68.8	51.7	51.8	66.3	0.0	49.3
Incr Delay (d2), s/veh	161.9	35.5	35.6	51.8	135.1	292.9	204.7	117.4	126.3	220.1	0.0	38.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.7	32.2	33.2	9.2	53.5	74.5	14.5	40.6	38.2	20.6	0.0	32.1
LnGrp Delay(d),s/veh	231.7	83.8	83.9	119.0	181.3	339.2	273.4	169.2	178.0	286.4	0.0	88.1
LnGrp LOS	F	F	F	F	F	F	F	F	F	F		F
Approach Vol, veh/h		1430			2021			1498			1208	
Approach Delay, s/veh		99.9			253.8			187.0			184.3	
Approach LOS		F			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.0	51.0	19.2	57.8	17.0	56.0	15.0	62.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	17.5	46.5	14.7	53.3	12.5	51.5	10.5	57.5
Max Q Clear Time (g_c+I1), s	19.5	48.5	15.8	55.3	14.5	53.5	12.5	59.5
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	188.1
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1810	308	284	1194	0	0	0	0	220	5	920
Future Volume (vph)	0	1810	308	284	1194	0	0	0	0	220	5	920
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5					4.5	4.5	4.5
Lane Util. Factor		0.95	1.00	0.97	0.95					0.95	0.91	0.95
Frt		1.00	0.85	1.00	1.00					1.00	0.86	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	1.00	1.00
Satd. Flow (prot)		3539	1583	3433	3539					1681	1452	1504
Flt Permitted		1.00	1.00	0.95	1.00					0.95	1.00	1.00
Satd. Flow (perm)		3539	1583	3433	3539					1681	1452	1504
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	1866	318	293	1231	0	0	0	0	227	5	948
RTOR Reduction (vph)	0	0	56	0	0	0	0	0	0	0	61	61
Lane Group Flow (vph)	0	1866	262	293	1231	0	0	0	0	204	432	422
Turn Type		NA	Perm	Prot	NA					Prot	NA	Perm
Protected Phases		4		3	8					1	6	
Permitted Phases			4									6
Actuated Green, G (s)		50.5	50.5	8.9	63.9					27.1	27.1	27.1
Effective Green, g (s)		50.5	50.5	8.9	63.9					27.1	27.1	27.1
Actuated g/C Ratio		0.50	0.50	0.09	0.64					0.27	0.27	0.27
Clearance Time (s)		4.5	4.5	4.5	4.5					4.5	4.5	4.5
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Lane Grp Cap (vph)		1787	799	305	2261					455	393	407
v/s Ratio Prot		c0.53		c0.09	0.35					0.12	c0.30	
v/s Ratio Perm			0.17									0.28
v/c Ratio		1.04	0.33	0.96	0.54					0.45	1.10	1.04
Uniform Delay, d1		24.8	14.7	45.4	10.0					30.2	36.5	36.5
Progression Factor		1.00	1.00	1.00	1.00					1.00	1.00	1.00
Incremental Delay, d2		33.9	0.2	40.8	0.3					0.7	74.7	54.3
Delay (s)		58.6	14.9	86.2	10.3					31.0	111.1	90.8
Level of Service		E	B	F	B					C	F	F
Approach Delay (s)		52.3			24.9			0.0			88.9	
Approach LOS		D			C			A			F	

Intersection Summary			
HCM 2000 Control Delay	52.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	85.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	176	2070	89	113	2008	442	75	388	216	467	198	121
Future Volume (veh/h)	176	2070	89	113	2008	442	75	388	216	467	198	121
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	187	2202	95	120	2136	470	80	413	230	497	211	129
Adj No. of Lanes	1	3	0	1	3	0	1	2	1	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	136	2017	87	89	1585	334	100	861	385	325	797	467
Arrive On Green	0.08	0.40	0.40	0.05	0.38	0.38	0.06	0.24	0.24	0.18	0.37	0.37
Sat Flow, veh/h	1774	5000	215	1774	4209	887	1774	3539	1583	1774	2150	1260
Grp Volume(v), veh/h	187	1490	807	120	1702	904	80	413	230	497	172	168
Grp Sat Flow(s),veh/h/ln	1774	1695	1825	1774	1695	1706	1774	1770	1583	1774	1770	1640
Q Serve(g_s), s	11.5	60.5	60.5	7.5	56.5	56.5	6.7	15.0	19.3	27.5	10.2	10.8
Cycle Q Clear(g_c), s	11.5	60.5	60.5	7.5	56.5	56.5	6.7	15.0	19.3	27.5	10.2	10.8
Prop In Lane	1.00		0.12	1.00		0.52	1.00		1.00	1.00		0.77
Lane Grp Cap(c), veh/h	136	1367	736	89	1277	643	100	861	385	325	656	608
V/C Ratio(X)	1.37	1.09	1.10	1.35	1.33	1.41	0.80	0.48	0.60	1.53	0.26	0.28
Avail Cap(c_a), veh/h	136	1367	736	89	1277	643	157	861	385	325	656	608
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	69.3	44.8	44.8	71.3	46.8	46.8	70.0	48.6	50.2	61.3	32.9	33.1
Incr Delay (d2), s/veh	208.1	52.5	62.8	216.0	155.4	192.0	14.5	1.9	6.7	252.7	1.0	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.5	38.3	43.3	9.0	54.0	60.9	3.7	7.6	9.2	36.3	5.1	5.1
LnGrp Delay(d),s/veh	277.3	97.3	107.5	287.2	202.1	238.7	84.4	50.5	56.9	314.0	33.9	34.2
LnGrp LOS	F	F	F	F	F	F	F	D	E	F	C	C
Approach Vol, veh/h		2484			2726			723			837	
Approach Delay, s/veh		114.2			218.0			56.3			200.3	
Approach LOS		F			F			E			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	32.0	41.0	12.0	65.0	12.9	60.1	16.0	61.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	27.5	36.5	7.5	60.5	13.3	50.7	11.5	56.5
Max Q Clear Time (g_c+I1), s	29.5	21.3	9.5	62.5	8.7	12.8	13.5	58.5
Green Ext Time (p_c), s	0.0	5.1	0.0	0.0	0.1	6.6	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	160.4
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	139	842	82	796	820	126	139	195	640	128	49	140
Future Volume (veh/h)	139	842	82	796	820	126	139	195	640	128	49	140
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	148	896	87	847	872	134	148	207	681	136	52	149
Adj No. of Lanes	1	3	0	1	3	0	1	2	0	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	179	1094	106	537	1930	295	391	614	549	63	614	549
Arrive On Green	0.10	0.23	0.23	0.30	0.43	0.43	0.35	0.35	0.35	0.35	0.35	0.35
Sat Flow, veh/h	1774	4716	456	1774	4452	681	1177	1770	1583	623	1770	1583
Grp Volume(v), veh/h	148	643	340	847	663	343	148	207	681	136	52	149
Grp Sat Flow(s),veh/h/ln	1774	1695	1782	1774	1695	1743	1177	1770	1583	623	1770	1583
Q Serve(g_s), s	9.3	20.5	20.6	34.5	15.7	15.8	11.8	9.9	39.5	0.0	2.3	7.7
Cycle Q Clear(g_c), s	9.3	20.5	20.6	34.5	15.7	15.8	19.6	9.9	39.5	39.5	2.3	7.7
Prop In Lane	1.00		0.26	1.00		0.39	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	179	786	413	537	1470	756	391	614	549	63	614	549
V/C Ratio(X)	0.82	0.82	0.82	1.58	0.45	0.45	0.38	0.34	1.24	2.15	0.08	0.27
Avail Cap(c_a), veh/h	397	967	508	537	1470	756	391	614	549	63	614	549
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.2	41.5	41.5	39.7	22.7	22.7	33.9	27.5	37.2	57.0	25.0	26.8
Incr Delay (d2), s/veh	9.1	4.6	8.7	268.3	0.2	0.4	2.8	1.5	123.1	567.0	0.3	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.0	10.1	11.1	56.9	7.4	7.7	4.1	5.1	36.0	11.9	1.1	3.6
LnGrp Delay(d),s/veh	59.4	46.1	50.2	308.0	22.9	23.2	36.7	29.0	160.3	623.9	25.3	28.1
LnGrp LOS	E	D	D	F	C	C	D	C	F	F	C	C
Approach Vol, veh/h		1131			1853			1036			337	
Approach Delay, s/veh		49.1			153.3			116.4			268.1	
Approach LOS		D			F			F			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		44.0	39.0	30.9		44.0	16.0	53.9
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		39.5	34.5	32.5		39.5	25.5	41.5
Max Q Clear Time (g_c+I1), s		41.5	36.5	22.6		41.5	11.3	17.8
Green Ext Time (p_c), s		0.0	0.0	3.8		0.0	0.3	15.0

Intersection Summary	
HCM 2010 Ctrl Delay	126.3
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	335	316	16	346	22	137	55	35	12	27	10
Future Volume (veh/h)	16	335	316	16	346	22	137	55	35	12	27	10
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	17	356	336	17	368	23	146	59	37	13	29	11
Adj No. of Lanes	1	3	1	1	3	0	2	2	0	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	38	1898	591	38	1828	113	321	407	235	30	284	102
Arrive On Green	0.02	0.37	0.37	0.02	0.37	0.37	0.09	0.19	0.19	0.02	0.11	0.11
Sat Flow, veh/h	1774	5085	1583	1774	4897	303	3442	2162	1249	1774	2555	916
Grp Volume(v), veh/h	17	356	336	17	254	137	146	47	49	13	20	20
Grp Sat Flow(s),veh/h/ln	1774	1695	1583	1774	1695	1809	1721	1770	1642	1774	1770	1701
Q Serve(g_s), s	0.4	2.1	7.6	0.4	2.3	2.3	1.8	1.0	1.1	0.3	0.4	0.5
Cycle Q Clear(g_c), s	0.4	2.1	7.6	0.4	2.3	2.3	1.8	1.0	1.1	0.3	0.4	0.5
Prop In Lane	1.00		1.00	1.00		0.17	1.00		0.76	1.00		0.54
Lane Grp Cap(c), veh/h	38	1898	591	38	1265	675	321	333	309	30	197	189
V/C Ratio(X)	0.45	0.19	0.57	0.45	0.20	0.20	0.45	0.14	0.16	0.44	0.10	0.11
Avail Cap(c_a), veh/h	375	5039	1569	375	3359	1793	1188	1596	1481	296	1281	1231
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.7	9.5	11.2	21.7	9.5	9.5	19.3	15.2	15.3	21.9	17.9	17.9
Incr Delay (d2), s/veh	8.2	0.0	0.9	8.2	0.1	0.1	1.0	0.2	0.2	9.9	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	1.0	3.4	0.3	1.1	1.2	0.9	0.5	0.5	0.2	0.2	0.2
LnGrp Delay(d),s/veh	29.9	9.5	12.1	29.9	9.6	9.7	20.3	15.4	15.5	31.8	18.1	18.2
LnGrp LOS	C	A	B	C	A	A	C	B	B	C	B	B
Approach Vol, veh/h		709			408			242			53	
Approach Delay, s/veh		11.2			10.5			18.4			21.5	
Approach LOS		B			B			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.2	12.9	5.5	21.3	8.7	9.5	5.5	21.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	7.5	40.5	9.5	44.5	15.5	32.5	9.5	44.5
Max Q Clear Time (g_c+I1), s	2.3	3.1	2.4	9.6	3.8	2.5	2.4	4.3
Green Ext Time (p_c), s	0.0	0.8	0.0	7.2	0.3	0.8	0.0	7.3

Intersection Summary	
HCM 2010 Ctrl Delay	12.6
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	398	1870	27	137	1957	10	33	10	115	10	10	617
Future Volume (veh/h)	398	1870	27	137	1957	10	33	10	115	10	10	617
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	415	1948	28	143	2039	10	34	10	120	10	10	643
Adj No. of Lanes	1	3	0	1	3	1	1	1	0	1	1	2
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	396	2659	38	166	1959	610	45	32	381	20	454	679
Arrive On Green	0.22	0.51	0.51	0.09	0.39	0.39	0.03	0.26	0.26	0.01	0.24	0.24
Sat Flow, veh/h	1774	5166	74	1774	5085	1583	1774	123	1479	1774	1863	2787
Grp Volume(v), veh/h	415	1278	698	143	2039	10	34	0	130	10	10	643
Grp Sat Flow(s),veh/h/ln	1774	1695	1850	1774	1695	1583	1774	0	1602	1774	1863	1393
Q Serve(g_s), s	32.7	43.1	43.1	11.7	56.5	0.6	2.8	0.0	9.6	0.8	0.6	33.3
Cycle Q Clear(g_c), s	32.7	43.1	43.1	11.7	56.5	0.6	2.8	0.0	9.6	0.8	0.6	33.3
Prop In Lane	1.00		0.04	1.00		1.00	1.00		0.92	1.00		1.00
Lane Grp Cap(c), veh/h	396	1745	952	166	1959	610	45	0	413	20	454	679
V/C Ratio(X)	1.05	0.73	0.73	0.86	1.04	0.02	0.75	0.00	0.31	0.49	0.02	0.95
Avail Cap(c_a), veh/h	396	1745	952	198	1959	610	86	0	413	60	454	679
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.0	27.7	27.7	65.6	45.1	27.9	71.0	0.0	44.0	72.1	42.2	54.5
Incr Delay (d2), s/veh	58.7	1.6	2.9	26.8	31.9	0.0	21.6	0.0	2.0	17.4	0.1	23.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	22.4	20.5	22.7	7.0	32.1	0.3	1.6	0.0	4.5	0.5	0.3	15.0
LnGrp Delay(d),s/veh	115.7	29.3	30.7	92.3	77.0	27.9	92.6	0.0	46.0	89.5	42.3	78.4
LnGrp LOS	F	C	C	F	F	C	F		D	F	D	E
Approach Vol, veh/h		2391			2192			164			663	
Approach Delay, s/veh		44.7			77.8			55.6			78.0	
Approach LOS		D			E			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.2	42.3	18.2	80.0	8.2	40.2	37.2	61.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	37.8	16.4	72.8	7.1	35.7	32.7	56.5
Max Q Clear Time (g_c+I1), s	2.8	11.6	13.7	45.1	4.8	35.3	34.7	58.5
Green Ext Time (p_c), s	0.0	3.8	0.1	26.8	0.0	0.2	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	62.5
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1656	533	0	2027	93	576	0	599	0	0	0
Future Volume (veh/h)	0	1656	533	0	2027	93	576	0	599	0	0	0
Number	7	4	14	3	8	18	5	2	12			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	0	1863	1863	0	1863	1863	1900	1863	1863			
Adj Flow Rate, veh/h	0	1995	0	0	2442	0	694	21	708			
Adj No. of Lanes	0	3	1	0	3	1	0	1	1			
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83			
Percent Heavy Veh, %	0	2	2	0	2	2	2	2	2			
Cap, veh/h	0	2405	749	0	2405	749	754	23	692			
Arrive On Green	0.00	0.47	0.00	0.00	0.47	0.00	0.44	0.44	0.44			
Sat Flow, veh/h	0	5253	1583	0	5253	1583	1724	52	1583			
Grp Volume(v), veh/h	0	1995	0	0	2442	0	715	0	708			
Grp Sat Flow(s),veh/h/ln	0	1695	1583	0	1695	1583	1777	0	1583			
Q Serve(g_s), s	0.0	34.0	0.0	0.0	47.3	0.0	37.9	0.0	43.7			
Cycle Q Clear(g_c), s	0.0	34.0	0.0	0.0	47.3	0.0	37.9	0.0	43.7			
Prop In Lane	0.00		1.00	0.00		1.00	0.97		1.00			
Lane Grp Cap(c), veh/h	0	2405	749	0	2405	749	776	0	692			
V/C Ratio(X)	0.00	0.83	0.00	0.00	1.02	0.00	0.92	0.00	1.02			
Avail Cap(c_a), veh/h	0	2405	749	0	2405	749	776	0	692			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	22.9	0.0	0.0	26.4	0.0	26.5	0.0	28.1			
Incr Delay (d2), s/veh	0.0	2.6	0.0	0.0	22.2	0.0	18.0	0.0	40.2			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	16.5	0.0	0.0	27.0	0.0	22.3	0.0	26.8			
LnGrp Delay(d),s/veh	0.0	25.4	0.0	0.0	48.6	0.0	44.5	0.0	68.4			
LnGrp LOS		C			F		D		F			
Approach Vol, veh/h		1995			2442			1423				
Approach Delay, s/veh		25.4			48.6			56.4				
Approach LOS		C			D			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		48.2		51.8				51.8
Change Period (Y+Rc), s		4.5		4.5				4.5
Max Green Setting (Gmax), s		43.7		47.3				47.3
Max Q Clear Time (g_c+I1), s		45.7		36.0				49.3
Green Ext Time (p_c), s		0.0		11.2				0.0

Intersection Summary	
HCM 2010 Ctrl Delay	42.6
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	614	1101	220	264	1282	318	182	693	380	396	849	272
Future Volume (veh/h)	614	1101	220	264	1282	318	182	693	380	396	849	272
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	714	1280	256	307	1491	370	212	806	442	460	987	316
Adj No. of Lanes	2	3	1	2	3	1	2	2	1	2	2	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	668	1832	570	359	1376	429	223	1019	456	438	927	295
Arrive On Green	0.19	0.36	0.36	0.10	0.27	0.27	0.06	0.29	0.29	0.13	0.35	0.35
Sat Flow, veh/h	3442	5085	1583	3442	5085	1583	3442	3539	1583	3442	2643	841
Grp Volume(v), veh/h	714	1280	256	307	1491	370	212	806	442	460	659	644
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1695	1583	1721	1770	1583	1721	1770	1714
Q Serve(g_s), s	29.1	32.3	18.5	13.2	40.6	33.4	9.2	31.5	41.4	19.1	52.6	52.6
Cycle Q Clear(g_c), s	29.1	32.3	18.5	13.2	40.6	33.4	9.2	31.5	41.4	19.1	52.6	52.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.49
Lane Grp Cap(c), veh/h	668	1832	570	359	1376	429	223	1019	456	438	621	601
V/C Ratio(X)	1.07	0.70	0.45	0.85	1.08	0.86	0.95	0.79	0.97	1.05	1.06	1.07
Avail Cap(c_a), veh/h	668	1832	570	468	1376	429	223	1019	456	438	621	601
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.5	41.0	36.6	66.0	54.7	52.1	69.9	49.2	52.7	65.4	48.7	48.7
Incr Delay (d2), s/veh	54.9	1.2	0.6	11.5	50.2	16.5	47.0	6.3	35.2	56.6	53.6	57.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	18.9	15.3	8.2	6.8	25.4	16.6	5.8	16.2	22.5	12.5	34.9	34.5
LnGrp Delay(d),s/veh	115.3	42.2	37.2	77.5	104.9	68.5	116.9	55.5	87.9	122.1	102.3	106.1
LnGrp LOS	F	D	D	E	F	E	F	E	F	F	F	F
Approach Vol, veh/h		2250			2168			1460			1763	
Approach Delay, s/veh		64.8			94.8			74.2			108.8	
Approach LOS		E			F			E			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	23.6	47.7	20.2	58.5	14.2	57.1	33.6	45.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	19.1	43.2	20.4	49.3	9.7	52.6	29.1	40.6
Max Q Clear Time (g_c+I1), s	21.1	43.4	15.2	34.3	11.2	54.6	31.1	42.6
Green Ext Time (p_c), s	0.0	0.0	0.5	14.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	85.3
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	129	346	154	131	187	371	181	1768	500	402	1190	57
Future Volume (veh/h)	129	346	154	131	187	371	181	1768	500	402	1190	57
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	133	357	159	135	193	382	187	1823	515	414	1227	59
Adj No. of Lanes	1	2	0	1	2	1	2	3	1	2	3	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	134	689	302	134	1017	455	250	1815	565	413	2056	640
Arrive On Green	0.08	0.29	0.29	0.08	0.29	0.29	0.07	0.36	0.36	0.12	0.40	0.40
Sat Flow, veh/h	1774	2397	1050	1774	3539	1583	3442	5085	1583	3442	5085	1583
Grp Volume(v), veh/h	133	262	254	135	193	382	187	1823	515	414	1227	59
Grp Sat Flow(s),veh/h/ln	1774	1770	1677	1774	1770	1583	1721	1695	1583	1721	1695	1583
Q Serve(g_s), s	8.4	13.9	14.3	8.5	4.6	25.5	6.0	40.1	34.8	13.5	21.3	2.6
Cycle Q Clear(g_c), s	8.4	13.9	14.3	8.5	4.6	25.5	6.0	40.1	34.8	13.5	21.3	2.6
Prop In Lane	1.00		0.63	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	134	508	482	134	1017	455	250	1815	565	413	2056	640
V/C Ratio(X)	0.99	0.52	0.53	1.01	0.19	0.84	0.75	1.00	0.91	1.00	0.60	0.09
Avail Cap(c_a), veh/h	134	628	596	134	1257	562	355	1815	565	413	2056	640
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.9	33.5	33.6	51.9	30.2	37.6	51.1	36.1	34.5	49.4	26.3	20.7
Incr Delay (d2), s/veh	74.9	0.8	0.9	79.3	0.1	9.2	5.3	22.3	21.4	44.6	1.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.9	6.9	6.8	7.1	2.3	12.3	3.0	22.4	18.6	8.9	10.1	1.2
LnGrp Delay(d),s/veh	126.8	34.3	34.5	131.3	30.3	46.8	56.4	58.4	55.8	94.0	27.6	21.0
LnGrp LOS	F	C	C	F	C	D	E	F	E	F	C	C
Approach Vol, veh/h		649			710			2525			1700	
Approach Delay, s/veh		53.3			58.4			57.7			43.5	
Approach LOS		D			E			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.0	44.6	13.0	36.8	12.7	49.9	13.0	36.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	13.5	40.1	8.5	39.9	11.6	42.0	8.5	39.9
Max Q Clear Time (g_c+I1), s	15.5	42.1	10.5	16.3	8.0	23.3	10.4	27.5
Green Ext Time (p_c), s	0.0	0.0	0.0	6.3	0.2	17.7	0.0	4.8

Intersection Summary	
HCM 2010 Ctrl Delay	53.0
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	200	14	85	10	10	10	77	1089	10	33	681	149
Future Volume (veh/h)	200	14	85	10	10	10	77	1089	10	33	681	149
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	220	15	93	11	11	11	85	1197	11	36	748	164
Adj No. of Lanes	1	2	0	1	2	1	1	2	1	1	2	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	271	354	317	24	215	96	110	1849	827	61	1430	314
Arrive On Green	0.15	0.20	0.20	0.01	0.06	0.06	0.06	0.52	0.52	0.03	0.50	0.50
Sat Flow, veh/h	1774	1770	1583	1774	3539	1583	1774	3539	1583	1774	2888	633
Grp Volume(v), veh/h	220	15	93	11	11	11	85	1197	11	36	458	454
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	1770	1583	1774	1770	1751
Q Serve(g_s), s	9.4	0.5	3.9	0.5	0.2	0.5	3.7	19.2	0.3	1.6	13.8	13.8
Cycle Q Clear(g_c), s	9.4	0.5	3.9	0.5	0.2	0.5	3.7	19.2	0.3	1.6	13.8	13.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.36
Lane Grp Cap(c), veh/h	271	354	317	24	215	96	110	1849	827	61	877	867
V/C Ratio(X)	0.81	0.04	0.29	0.46	0.05	0.11	0.78	0.65	0.01	0.59	0.52	0.52
Avail Cap(c_a), veh/h	701	699	625	113	226	101	192	1849	827	113	877	867
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.2	25.3	26.7	38.4	34.7	34.9	36.3	13.5	9.0	37.3	13.5	13.5
Incr Delay (d2), s/veh	5.8	0.0	0.5	12.9	0.1	0.5	11.1	1.8	0.0	8.6	2.2	2.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.0	0.3	1.7	0.3	0.1	0.2	2.2	9.8	0.1	0.9	7.3	7.2
LnGrp Delay(d),s/veh	37.9	25.4	27.2	51.3	34.8	35.4	47.4	15.3	9.0	45.9	15.7	15.7
LnGrp LOS	D	C	C	D	C	D	D	B	A	D	B	B
Approach Vol, veh/h		328			33			1293			948	
Approach Delay, s/veh		34.3			40.5			17.3			16.9	
Approach LOS		C			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.2	45.5	5.6	20.2	9.3	43.4	16.5	9.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	41.0	5.0	31.0	8.5	37.5	31.0	5.0
Max Q Clear Time (g_c+I1), s	3.6	21.2	2.5	5.9	5.7	15.8	11.4	2.5
Green Ext Time (p_c), s	0.0	14.4	0.0	0.7	0.0	15.4	0.6	0.1

Intersection Summary	
HCM 2010 Ctrl Delay	19.6
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	598	14	469	15	12	10	251	984	22	10	407	466
Future Volume (veh/h)	598	14	469	15	12	10	251	984	22	10	407	466
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	650	15	510	16	13	11	273	1070	24	11	442	507
Adj No. of Lanes	1	1	1	1	2	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	549	655	557	32	117	87	251	1515	34	24	1061	475
Arrive On Green	0.31	0.35	0.35	0.02	0.06	0.06	0.14	0.43	0.43	0.01	0.30	0.30
Sat Flow, veh/h	1774	1863	1583	1774	1935	1443	1774	3539	79	1774	3539	1583
Grp Volume(v), veh/h	650	15	510	16	12	12	273	535	559	11	442	507
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1770	1608	1774	1770	1849	1774	1770	1583
Q Serve(g_s), s	29.5	0.5	29.4	0.9	0.6	0.7	13.5	23.6	23.6	0.6	9.5	28.6
Cycle Q Clear(g_c), s	29.5	0.5	29.4	0.9	0.6	0.7	13.5	23.6	23.6	0.6	9.5	28.6
Prop In Lane	1.00		1.00	1.00		0.90	1.00		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	549	655	557	32	107	97	251	758	792	24	1061	475
V/C Ratio(X)	1.18	0.02	0.92	0.50	0.11	0.13	1.09	0.71	0.71	0.47	0.42	1.07
Avail Cap(c_a), veh/h	549	1066	907	99	564	513	251	758	792	93	1061	475
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.9	20.2	29.6	46.4	42.4	42.4	40.9	22.3	22.3	46.7	26.7	33.4
Incr Delay (d2), s/veh	100.4	0.0	8.9	11.4	0.4	0.6	82.0	5.5	5.3	13.8	1.2	60.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	29.6	0.3	14.1	0.5	0.3	0.3	12.3	12.6	13.1	0.4	4.8	20.5
LnGrp Delay(d),s/veh	133.4	20.2	38.5	57.8	42.8	43.0	122.9	27.8	27.6	60.5	27.9	93.9
LnGrp LOS	F	C	D	E	D	D	F	C	C	E	C	F
Approach Vol, veh/h		1175			40			1367			960	
Approach Delay, s/veh		90.7			48.9			46.7			63.2	
Approach LOS		F			D			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.8	45.3	6.2	38.0	18.0	33.1	34.0	10.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	37.1	5.3	54.6	13.5	28.6	29.5	30.4
Max Q Clear Time (g_c+I1), s	2.6	25.6	2.9	31.4	15.5	30.6	31.5	2.7
Green Ext Time (p_c), s	0.0	8.4	0.0	2.2	0.0	0.0	0.0	2.2

Intersection Summary	
HCM 2010 Ctrl Delay	65.8
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	559	264	14	62	195	139	10	267	53	124	269	676
Future Volume (veh/h)	559	264	14	62	195	139	10	267	53	124	269	676
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	559	264	14	62	195	139	10	267	53	124	269	676
Adj No. of Lanes	1	2	1	1	2	1	1	2	1	1	2	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	599	1522	681	80	486	217	22	893	399	153	1155	517
Arrive On Green	0.34	0.43	0.43	0.05	0.14	0.14	0.01	0.25	0.25	0.09	0.33	0.33
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	559	264	14	62	195	139	10	267	53	124	269	676
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	29.4	4.4	0.5	3.3	4.9	8.0	0.5	5.9	2.5	6.6	5.4	31.5
Cycle Q Clear(g_c), s	29.4	4.4	0.5	3.3	4.9	8.0	0.5	5.9	2.5	6.6	5.4	31.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	599	1522	681	80	486	217	22	893	399	153	1155	517
V/C Ratio(X)	0.93	0.17	0.02	0.77	0.40	0.64	0.46	0.30	0.13	0.81	0.23	1.31
Avail Cap(c_a), veh/h	707	2046	915	178	990	443	92	1008	451	165	1155	517
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.9	16.9	15.8	45.6	38.0	39.4	47.4	29.2	27.9	43.3	23.7	32.5
Incr Delay (d2), s/veh	17.6	0.1	0.0	14.6	0.5	3.1	14.6	0.2	0.1	23.8	0.1	152.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.2	2.2	0.2	2.0	2.4	3.7	0.4	2.9	1.1	4.3	2.6	35.6
LnGrp Delay(d),s/veh	48.5	17.0	15.8	60.2	38.6	42.5	62.0	29.4	28.1	67.2	23.8	184.8
LnGrp LOS	D	B	B	E	D	D	E	C	C	E	C	F
Approach Vol, veh/h		837			396			330			1069	
Approach Delay, s/veh		38.0			43.3			30.2			130.7	
Approach LOS		D			D			C			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.8	28.8	8.9	46.0	5.7	36.0	37.1	17.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.0	27.5	9.7	55.8	5.0	31.5	38.5	27.0
Max Q Clear Time (g_c+I1), s	8.6	7.9	5.3	6.4	2.5	33.5	31.4	10.0
Green Ext Time (p_c), s	0.0	6.6	0.0	3.9	0.0	0.0	1.2	3.2

Intersection Summary	
HCM 2010 Ctrl Delay	75.5
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	230	58	131	10	54	10	373	572	10	10	720	29
Future Volume (veh/h)	230	58	131	10	54	10	373	572	10	10	720	29
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	230	58	131	10	54	10	373	572	10	10	720	29
Adj No. of Lanes	1	2	1	1	2	1	1	2	0	1	2	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	275	737	330	22	232	104	426	1885	33	22	1047	42
Arrive On Green	0.16	0.21	0.21	0.01	0.07	0.07	0.24	0.53	0.53	0.01	0.30	0.30
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1774	3559	62	1774	3468	140
Grp Volume(v), veh/h	230	58	131	10	54	10	373	284	298	10	367	382
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	1770	1852	1774	1770	1838
Q Serve(g_s), s	9.6	1.0	5.4	0.4	1.1	0.5	15.4	6.8	6.8	0.4	13.9	13.9
Cycle Q Clear(g_c), s	9.6	1.0	5.4	0.4	1.1	0.5	15.4	6.8	6.8	0.4	13.9	13.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.03	1.00		0.08
Lane Grp Cap(c), veh/h	275	737	330	22	232	104	426	937	981	22	534	555
V/C Ratio(X)	0.83	0.08	0.40	0.45	0.23	0.10	0.88	0.30	0.30	0.45	0.69	0.69
Avail Cap(c_a), veh/h	409	1841	824	117	1259	563	643	1224	1280	117	699	726
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.1	24.2	25.9	37.2	33.7	33.4	27.8	10.0	10.0	37.2	23.3	23.3
Incr Delay (d2), s/veh	9.2	0.0	0.8	13.6	0.5	0.4	8.8	0.2	0.2	13.6	1.9	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	0.5	2.4	0.3	0.6	0.2	8.5	3.4	3.5	0.3	7.0	7.3
LnGrp Delay(d),s/veh	40.4	24.2	26.7	50.8	34.2	33.8	36.6	10.2	10.2	50.8	25.2	25.1
LnGrp LOS	D	C	C	D	C	C	D	B	B	D	C	C
Approach Vol, veh/h		419			74			955			759	
Approach Delay, s/veh		33.9			36.4			20.5			25.5	
Approach LOS		C			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.5	44.7	5.5	20.3	22.7	27.4	16.3	9.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	52.5	5.0	39.5	27.5	30.0	17.5	27.0
Max Q Clear Time (g_c+I1), s	2.4	8.8	2.4	7.4	17.4	15.9	11.6	3.1
Green Ext Time (p_c), s	0.0	11.0	0.0	1.2	0.9	7.0	0.3	1.1

Intersection Summary	
HCM 2010 Ctrl Delay	25.3
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	325	1181	164	366	10	1231	1777	181	10	1107	10
Future Volume (veh/h)	10	325	1181	164	366	10	1231	1777	181	10	1107	10
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	10	325	1181	164	366	10	1231	1777	181	10	1107	10
Adj No. of Lanes	2	2	2	2	2	1	2	3	1	2	3	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	40	648	510	190	803	359	1279	3157	983	40	1326	413
Arrive On Green	0.01	0.18	0.18	0.06	0.23	0.23	0.37	0.62	0.62	0.01	0.26	0.26
Sat Flow, veh/h	3442	3539	2787	3442	3539	1583	3442	5085	1583	3442	5085	1583
Grp Volume(v), veh/h	10	325	1181	164	366	10	1231	1777	181	10	1107	10
Grp Sat Flow(s),veh/h/ln	1721	1770	1393	1721	1770	1583	1721	1695	1583	1721	1695	1583
Q Serve(g_s), s	0.4	11.5	25.5	6.6	12.4	0.7	48.7	28.4	6.8	0.4	28.6	0.7
Cycle Q Clear(g_c), s	0.4	11.5	25.5	6.6	12.4	0.7	48.7	28.4	6.8	0.4	28.6	0.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	40	648	510	190	803	359	1279	3157	983	40	1326	413
V/C Ratio(X)	0.25	0.50	2.31	0.86	0.46	0.03	0.96	0.56	0.18	0.25	0.84	0.02
Avail Cap(c_a), veh/h	124	648	510	190	803	359	1298	3157	983	124	1326	413
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	68.2	51.2	56.9	65.2	46.4	41.9	42.8	15.4	11.3	68.2	48.6	38.3
Incr Delay (d2), s/veh	3.3	0.6	597.6	30.9	0.4	0.0	16.7	0.7	0.4	3.3	6.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	5.7	52.2	4.0	6.1	0.3	26.0	13.4	3.1	0.2	14.2	0.3
LnGrp Delay(d),s/veh	71.5	51.8	654.4	96.1	46.8	41.9	59.5	16.1	11.7	71.5	55.0	38.4
LnGrp LOS	E	D	F	F	D	D	E	B	B	E	D	D
Approach Vol, veh/h		1516			540			3189			1127	
Approach Delay, s/veh		521.4			61.7			32.6			55.0	
Approach LOS		F			E			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.1	90.9	12.2	30.0	56.2	40.8	6.1	36.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	83.8	7.7	25.5	52.5	36.3	5.0	28.2
Max Q Clear Time (g_c+I1), s	2.4	30.4	8.6	27.5	50.7	30.6	2.4	14.4
Green Ext Time (p_c), s	0.0	42.0	0.0	0.0	1.0	5.4	0.0	8.5

Intersection Summary	
HCM 2010 Ctrl Delay	155.3
HCM 2010 LOS	F

FUTURE YEAR 2035 WITH PROJECT CONDITIONS WITH IMPROVEMENTS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	67	12	973	87	299	13	455	253	814	985	10
Future Volume (veh/h)	23	67	12	973	87	299	13	455	253	814	985	10
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	25	73	13	1058	95	325	14	495	275	885	1071	11
Adj No. of Lanes	1	3	0	2	3	1	1	3	2	2	3	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	43	254	43	915	1522	474	28	1423	1520	786	2556	26
Arrive On Green	0.02	0.06	0.06	0.27	0.30	0.30	0.02	0.28	0.28	0.23	0.49	0.49
Sat Flow, veh/h	1774	4380	742	3442	5085	1583	1774	5085	2787	3442	5190	53
Grp Volume(v), veh/h	25	56	30	1058	95	325	14	495	275	885	699	383
Grp Sat Flow(s),veh/h/ln	1774	1695	1732	1721	1695	1583	1774	1695	1393	1721	1695	1853
Q Serve(g_s), s	1.5	1.7	1.8	28.5	1.4	19.4	0.8	8.3	5.3	24.5	14.1	14.2
Cycle Q Clear(g_c), s	1.5	1.7	1.8	28.5	1.4	19.4	0.8	8.3	5.3	24.5	14.1	14.2
Prop In Lane	1.00		0.43	1.00		1.00	1.00		1.00	1.00		0.03
Lane Grp Cap(c), veh/h	43	197	101	915	1522	474	28	1423	1520	786	1669	913
V/C Ratio(X)	0.58	0.28	0.30	1.16	0.06	0.69	0.50	0.35	0.18	1.13	0.42	0.42
Avail Cap(c_a), veh/h	103	1233	630	915	2907	905	89	1423	1520	786	1669	913
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.7	48.4	48.4	39.4	26.8	33.1	52.3	30.8	12.3	41.4	17.4	17.4
Incr Delay (d2), s/veh	11.5	0.8	1.7	82.8	0.0	1.8	12.9	0.7	0.3	72.4	0.8	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.8	0.9	24.0	0.7	8.7	0.5	4.0	2.1	19.5	6.8	7.6
LnGrp Delay(d),s/veh	63.2	49.1	50.1	122.2	26.8	34.9	65.2	31.5	12.5	113.8	18.2	18.8
LnGrp LOS	E	D	D	F	C	C	E	C	B	F	B	B
Approach Vol, veh/h		111			1478			784			1967	
Approach Delay, s/veh		52.6			96.9			25.4			61.3	
Approach LOS		D			F			C			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	29.0	34.5	33.0	10.7	6.2	57.3	7.1	36.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	24.5	30.0	28.5	39.0	5.4	49.1	6.2	61.3
Max Q Clear Time (g_c+I1), s	26.5	10.3	30.5	3.8	2.8	16.2	3.5	21.4
Green Ext Time (p_c), s	0.0	11.9	0.0	2.4	0.0	15.9	0.0	2.4

Intersection Summary	
HCM 2010 Ctrl Delay	66.7
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	77	858	148	718	1012	337	50	218	266	350	465	537
Future Volume (veh/h)	77	858	148	718	1012	337	50	218	266	350	465	537
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	87	964	166	807	1137	379	56	245	299	393	522	603
Adj No. of Lanes	2	4	1	2	3	1	2	2	2	2	2	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	132	1357	335	809	2077	836	110	1075	846	411	692	619
Arrive On Green	0.04	0.21	0.21	0.24	0.41	0.41	0.03	0.30	0.30	0.12	0.39	0.39
Sat Flow, veh/h	3442	6408	1583	3442	5085	1583	3442	3539	2787	3442	1770	1583
Grp Volume(v), veh/h	87	964	166	807	1137	379	56	245	299	393	522	603
Grp Sat Flow(s),veh/h/ln	1721	1602	1583	1721	1695	1583	1721	1770	1393	1721	1770	1583
Q Serve(g_s), s	3.4	19.3	12.8	32.4	23.6	20.5	2.2	7.2	11.6	15.7	35.2	51.8
Cycle Q Clear(g_c), s	3.4	19.3	12.8	32.4	23.6	20.5	2.2	7.2	11.6	15.7	35.2	51.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	132	1357	335	809	2077	836	110	1075	846	411	692	619
V/C Ratio(X)	0.66	0.71	0.50	1.00	0.55	0.45	0.51	0.23	0.35	0.96	0.75	0.97
Avail Cap(c_a), veh/h	184	1437	355	809	2077	836	127	1075	846	411	692	619
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.6	50.6	48.0	52.9	31.2	20.3	65.9	36.0	37.5	60.5	36.4	41.4
Incr Delay (d2), s/veh	5.6	1.6	1.1	31.0	0.3	0.4	3.6	0.5	1.2	33.4	7.5	30.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	8.7	5.7	18.8	11.1	9.1	1.1	3.6	4.6	9.4	18.7	27.8
LnGrp Delay(d),s/veh	71.2	52.1	49.1	83.9	31.5	20.6	69.5	36.5	38.7	93.9	43.8	71.7
LnGrp LOS	E	D	D	F	C	C	E	D	D	F	D	E
Approach Vol, veh/h		1217			2323			600			1518	
Approach Delay, s/veh		53.1			47.9			40.7			67.9	
Approach LOS		D			D			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.0	46.5	37.0	33.8	8.9	58.6	9.8	61.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	16.5	42.0	32.5	31.0	5.1	53.4	7.4	56.1
Max Q Clear Time (g_c+I1), s	17.7	13.6	34.4	21.3	4.2	53.8	5.4	25.6
Green Ext Time (p_c), s	0.0	13.5	0.0	8.0	0.0	0.0	0.0	22.3

Intersection Summary	
HCM 2010 Ctrl Delay	53.6
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	165	104	104	10	71	187	99	1637	10	264	2371	151
Future Volume (veh/h)	165	104	104	10	71	187	99	1637	10	264	2371	151
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	179	113	113	11	77	203	108	1779	11	287	2577	164
Adj No. of Lanes	1	3	0	1	3	1	1	3	0	2	3	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	209	849	396	23	738	390	111	2536	16	347	2567	161
Arrive On Green	0.12	0.25	0.25	0.01	0.15	0.15	0.06	0.49	0.49	0.10	0.52	0.52
Sat Flow, veh/h	1774	3390	1583	1774	5085	1583	1774	5215	32	3442	4892	307
Grp Volume(v), veh/h	179	113	113	11	77	203	108	1156	634	287	1773	968
Grp Sat Flow(s),veh/h/ln	1774	1695	1583	1774	1695	1583	1774	1695	1857	1721	1695	1809
Q Serve(g_s), s	11.9	3.1	6.9	0.7	1.6	13.3	7.3	32.0	32.0	9.8	62.7	63.1
Cycle Q Clear(g_c), s	11.9	3.1	6.9	0.7	1.6	13.3	7.3	32.0	32.0	9.8	62.7	63.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.02	1.00		0.17
Lane Grp Cap(c), veh/h	209	849	396	23	738	390	111	1648	903	347	1779	949
V/C Ratio(X)	0.86	0.13	0.29	0.48	0.10	0.52	0.98	0.70	0.70	0.83	1.00	1.02
Avail Cap(c_a), veh/h	350	1308	611	74	1171	525	111	1648	903	426	1779	949
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.0	34.9	36.4	59.0	44.6	39.2	56.3	24.1	24.1	53.0	28.5	28.6
Incr Delay (d2), s/veh	10.3	0.1	0.4	15.2	0.1	1.1	77.7	2.5	4.5	10.6	20.6	34.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.4	1.5	3.1	0.5	0.7	6.0	6.0	15.5	17.5	5.2	34.1	40.4
LnGrp Delay(d),s/veh	62.3	35.0	36.8	74.1	44.7	40.3	134.0	26.6	28.6	63.6	49.1	62.8
LnGrp LOS	E	D	D	E	D	D	F	C	C	E	D	F
Approach Vol, veh/h		405			291			1898			3028	
Approach Delay, s/veh		47.6			42.7			33.4			54.8	
Approach LOS		D			D			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.6	63.0	6.0	34.6	12.0	67.6	18.7	22.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	14.9	55.7	5.0	46.4	7.5	63.1	23.7	27.7
Max Q Clear Time (g_c+I1), s	11.8	34.0	2.7	8.9	9.3	65.1	13.9	15.3
Green Ext Time (p_c), s	0.3	21.4	0.0	2.8	0.0	0.0	0.3	2.1

Intersection Summary	
HCM 2010 Ctrl Delay	46.4
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	108	123	142	443	375	37	538	172	121	83	218	288
Future Volume (veh/h)	108	123	142	443	375	37	538	172	121	83	218	288
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	108	123	142	443	375	37	538	172	121	83	218	288
Adj No. of Lanes	1	2	1	1	2	0	1	2	1	1	2	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	132	343	656	467	931	91	563	1578	706	104	331	296
Arrive On Green	0.07	0.10	0.10	0.26	0.29	0.29	0.32	0.45	0.45	0.06	0.19	0.19
Sat Flow, veh/h	1774	3539	1583	1774	3256	320	1774	3539	1583	1774	1770	1583
Grp Volume(v), veh/h	108	123	142	443	203	209	538	172	121	83	218	288
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1806	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	8.0	4.3	7.7	32.7	12.3	12.5	39.7	3.8	6.1	6.2	15.3	24.1
Cycle Q Clear(g_c), s	8.0	4.3	7.7	32.7	12.3	12.5	39.7	3.8	6.1	6.2	15.3	24.1
Prop In Lane	1.00		1.00	1.00		0.18	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	132	343	656	467	506	516	563	1578	706	104	331	296
V/C Ratio(X)	0.82	0.36	0.22	0.95	0.40	0.41	0.95	0.11	0.17	0.80	0.66	0.97
Avail Cap(c_a), veh/h	230	636	787	498	586	598	604	1578	706	179	331	296
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.9	56.4	25.1	48.3	38.5	38.5	44.6	21.5	22.2	62.0	50.3	53.9
Incr Delay (d2), s/veh	11.5	0.6	0.2	26.9	0.5	0.5	25.0	0.1	0.5	12.7	9.8	45.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.4	2.2	3.4	19.5	6.1	6.3	23.3	1.9	2.8	3.4	8.4	14.3
LnGrp Delay(d),s/veh	72.4	57.1	25.3	75.2	39.0	39.0	69.7	21.7	22.7	74.8	60.1	99.5
LnGrp LOS	E	E	C	E	D	D	E	C	C	E	E	F
Approach Vol, veh/h		373			855			831			589	
Approach Delay, s/veh		49.4			57.8			52.9			81.4	
Approach LOS		D			E			D			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.4	64.1	39.7	17.4	46.9	29.5	14.5	42.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	13.5	57.0	37.5	24.0	45.5	25.0	17.3	44.2
Max Q Clear Time (g_c+I1), s	8.2	8.1	34.7	9.7	41.7	26.1	10.0	14.5
Green Ext Time (p_c), s	0.1	5.6	0.4	3.2	0.8	0.0	0.1	4.0

Intersection Summary	
HCM 2010 Ctrl Delay	60.3
HCM 2010 LOS	E

7: California Oaks Rd & Clinton Keith Rd

Timing Plan: AM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1535	319	627	1121	243	627
Future Volume (vph)	1535	319	627	1121	243	627
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5	4.5	4.5	4.5
Lane Util. Factor	0.91		0.97	0.91	1.00	0.88
Frt	0.97		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	4954		3433	5085	1770	2787
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	4954		3433	5085	1770	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1616	336	660	1180	256	660
RTOR Reduction (vph)	22	0	0	0	0	490
Lane Group Flow (vph)	1930	0	660	1180	256	170
Turn Type	NA		Prot	NA	Perm	Perm
Protected Phases	4		3	8		
Permitted Phases					2	2
Actuated Green, G (s)	58.5		30.0	93.0	35.5	35.5
Effective Green, g (s)	58.5		30.0	93.0	35.5	35.5
Actuated g/C Ratio	0.43		0.22	0.68	0.26	0.26
Clearance Time (s)	4.5		4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2107		749	3439	456	719
v/s Ratio Prot	c0.39		c0.19	0.23		
v/s Ratio Perm					c0.14	0.06
v/c Ratio	0.92		0.88	0.34	0.56	0.24
Uniform Delay, d1	37.2		52.0	9.4	44.2	40.3
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	6.8		11.8	0.1	4.9	0.8
Delay (s)	43.9		63.8	9.4	49.2	41.1
Level of Service	D		E	A	D	D
Approach Delay (s)	43.9			28.9	43.3	
Approach LOS	D			C	D	

Intersection Summary			
HCM 2000 Control Delay	38.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	137.5	Sum of lost time (s)	13.5
Intersection Capacity Utilization	79.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	759	742	220	627	241	154	535	144	688	1141	49
Future Volume (veh/h)	26	759	742	220	627	241	154	535	144	688	1141	49
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	29	834	815	242	689	265	169	588	158	756	1254	54
Adj No. of Lanes	1	3	1	1	2	1	2	3	1	2	3	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	226	1762	549	212	1330	595	219	1398	435	676	2039	88
Arrive On Green	0.02	0.35	0.35	0.05	0.38	0.38	0.06	0.28	0.28	0.20	0.41	0.41
Sat Flow, veh/h	1774	5085	1583	1774	3539	1583	3442	5085	1583	3442	5000	215
Grp Volume(v), veh/h	29	834	815	242	689	265	169	588	158	756	850	458
Grp Sat Flow(s),veh/h/ln	1774	1695	1583	1774	1770	1583	1721	1695	1583	1721	1695	1825
Q Serve(g_s), s	1.5	18.0	48.5	7.5	21.1	17.6	6.8	13.3	11.3	27.5	27.8	27.8
Cycle Q Clear(g_c), s	1.5	18.0	48.5	7.5	21.1	17.6	6.8	13.3	11.3	27.5	27.8	27.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.12
Lane Grp Cap(c), veh/h	226	1762	549	212	1330	595	219	1398	435	676	1382	744
V/C Ratio(X)	0.13	0.47	1.49	1.14	0.52	0.45	0.77	0.42	0.36	1.12	0.62	0.62
Avail Cap(c_a), veh/h	248	1762	549	212	1330	595	302	1398	435	676	1382	744
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.3	35.8	45.8	41.2	33.9	32.8	64.5	41.6	40.9	56.2	32.8	32.8
Incr Delay (d2), s/veh	0.3	0.2	228.2	104.5	0.4	0.5	7.9	0.9	2.3	71.9	2.1	3.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	8.4	55.9	10.7	10.4	7.8	3.5	6.3	5.2	19.8	13.4	14.8
LnGrp Delay(d),s/veh	29.5	36.0	274.0	145.6	34.2	33.3	72.4	42.5	43.2	128.1	34.8	36.6
LnGrp LOS	C	D	F	F	C	C	E	D	D	F	C	D
Approach Vol, veh/h		1678			1196			915			2064	
Approach Delay, s/veh		151.5			56.6			48.2			69.4	
Approach LOS		F			E			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	32.0	43.0	12.0	53.0	13.4	61.6	7.9	57.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	27.5	38.5	7.5	48.5	12.3	53.7	5.1	50.9
Max Q Clear Time (g_c+I1), s	29.5	15.3	9.5	50.5	8.8	29.8	3.5	23.1
Green Ext Time (p_c), s	0.0	15.1	0.0	0.0	0.2	15.4	0.0	19.2

Intersection Summary	
HCM 2010 Ctrl Delay	87.0
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	1585	51	190	2071	269	76	63	59	462	443	155
Future Volume (veh/h)	65	1585	51	190	2071	269	76	63	59	462	443	155
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	69	1686	54	202	2203	286	81	67	63	491	471	165
Adj No. of Lanes	1	3	0	1	3	1	1	2	1	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	65	1569	50	171	1882	586	101	861	385	408	1074	373
Arrive On Green	0.04	0.31	0.31	0.10	0.37	0.37	0.06	0.24	0.24	0.23	0.42	0.42
Sat Flow, veh/h	1774	5062	162	1774	5085	1583	1774	3539	1583	1774	2577	897
Grp Volume(v), veh/h	69	1129	611	202	2203	286	81	67	63	491	322	314
Grp Sat Flow(s),veh/h/ln	1774	1695	1834	1774	1695	1583	1774	1770	1583	1774	1770	1705
Q Serve(g_s), s	5.5	46.5	46.5	14.5	55.5	20.8	6.8	2.2	4.7	34.5	19.5	19.7
Cycle Q Clear(g_c), s	5.5	46.5	46.5	14.5	55.5	20.8	6.8	2.2	4.7	34.5	19.5	19.7
Prop In Lane	1.00		0.09	1.00		1.00	1.00		1.00	1.00		0.53
Lane Grp Cap(c), veh/h	65	1051	569	171	1882	586	101	861	385	408	737	710
V/C Ratio(X)	1.06	1.07	1.07	1.18	1.17	0.49	0.80	0.08	0.16	1.20	0.44	0.44
Avail Cap(c_a), veh/h	65	1051	569	171	1882	586	158	861	385	408	737	710
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	72.3	51.8	51.8	67.8	47.3	36.3	69.9	43.8	44.7	57.8	31.2	31.3
Incr Delay (d2), s/veh	129.4	49.9	59.4	124.7	83.0	0.6	14.6	0.2	0.9	112.7	1.9	2.0
Initial Q Delay(d3),s/veh	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.0	29.0	32.9	13.0	40.4	9.2	3.7	1.1	2.2	29.7	9.9	9.7
LnGrp Delay(d),s/veh	203.2	101.7	111.2	192.4	130.2	37.0	84.5	43.9	45.6	170.5	33.1	33.3
LnGrp LOS	F	F	F	F	F	D	F	D	D	F	C	C
Approach Vol, veh/h		1809			2691			211			1127	
Approach Delay, s/veh		108.8			125.0			60.0			93.0	
Approach LOS		F			F			E			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	39.0	41.0	19.0	51.0	13.0	67.0	10.0	60.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	34.5	36.5	14.5	46.5	13.4	57.6	5.5	55.5
Max Q Clear Time (g_c+I1), s	36.5	6.7	16.5	48.5	8.8	21.7	7.5	57.5
Green Ext Time (p_c), s	0.0	5.1	0.0	0.0	0.1	5.3	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	111.4
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	51	666	104	376	749	107	115	44	926	219	89	158
Future Volume (veh/h)	51	666	104	376	749	107	115	44	926	219	89	158
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	54	709	111	400	797	114	122	47	985	233	95	168
Adj No. of Lanes	1	3	0	2	3	0	1	1	1	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	70	1109	172	477	1570	223	541	910	993	324	864	773
Arrive On Green	0.04	0.25	0.25	0.14	0.35	0.35	0.49	0.49	0.49	0.49	0.49	0.49
Sat Flow, veh/h	1774	4443	689	3442	4500	640	1112	1863	1583	544	1770	1583
Grp Volume(v), veh/h	54	539	281	400	599	312	122	47	985	233	95	168
Grp Sat Flow(s),veh/h/ln	1774	1695	1741	1721	1695	1750	1112	1863	1583	544	1770	1583
Q Serve(g_s), s	3.3	15.6	15.8	12.4	15.3	15.5	7.7	1.5	53.5	43.0	3.2	6.7
Cycle Q Clear(g_c), s	3.3	15.6	15.8	12.4	15.3	15.5	14.4	1.5	53.5	44.5	3.2	6.7
Prop In Lane	1.00		0.40	1.00		0.37	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	70	846	435	477	1183	611	541	910	993	324	864	773
V/C Ratio(X)	0.77	0.64	0.65	0.84	0.51	0.51	0.23	0.05	0.99	0.72	0.11	0.22
Avail Cap(c_a), veh/h	232	1006	517	644	1198	618	541	910	993	324	864	773
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.1	36.7	36.8	46.0	28.2	28.3	20.2	14.7	20.2	26.4	15.2	16.0
Incr Delay (d2), s/veh	16.2	1.0	2.1	7.2	0.3	0.7	1.0	0.1	26.7	12.8	0.3	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	7.4	7.8	6.4	7.2	7.6	2.5	0.8	36.3	7.6	1.6	3.0
LnGrp Delay(d),s/veh	68.4	37.7	38.9	53.2	28.5	28.9	21.1	14.8	46.9	39.2	15.4	16.7
LnGrp LOS	E	D	D	D	C	C	C	B	D	D	B	B
Approach Vol, veh/h		874			1311			1154			496	
Approach Delay, s/veh		40.0			36.1			42.8			27.0	
Approach LOS		D			D			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		58.0	19.7	31.9		58.0	8.8	42.7
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		53.5	20.5	32.5		53.5	14.3	38.7
Max Q Clear Time (g_c+I1), s		55.5	14.4	17.8		46.5	5.3	17.5
Green Ext Time (p_c), s		0.0	0.8	9.6		4.9	0.1	12.2

Intersection Summary	
HCM 2010 Ctrl Delay	37.9
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	566	1896	209	176	1388	15	55	10	192	10	38	27
Future Volume (veh/h)	566	1896	209	176	1388	15	55	10	192	10	38	27
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	590	1975	218	183	1446	16	57	10	200	10	40	28
Adj No. of Lanes	1	3	0	1	3	1	1	1	0	1	1	2
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	584	2358	258	225	1490	464	73	21	417	20	457	683
Arrive On Green	0.30	0.51	0.51	0.09	0.29	0.29	0.04	0.27	0.27	0.01	0.25	0.25
Sat Flow, veh/h	1774	4654	509	1774	5085	1583	1774	76	1519	1774	1863	2787
Grp Volume(v), veh/h	590	1434	759	183	1446	16	57	0	210	10	40	28
Grp Sat Flow(s),veh/h/ln	1774	1695	1773	1774	1695	1583	1774	0	1595	1774	1863	1393
Q Serve(g_s), s	44.5	53.7	54.8	10.6	41.7	1.1	4.7	0.0	16.3	0.8	2.5	1.1
Cycle Q Clear(g_c), s	44.5	53.7	54.8	10.6	41.7	1.1	4.7	0.0	16.3	0.8	2.5	1.1
Prop In Lane	1.00		0.29	1.00		1.00	1.00		0.95	1.00		1.00
Lane Grp Cap(c), veh/h	584	1718	898	225	1490	464	73	0	438	20	457	683
V/C Ratio(X)	1.01	0.83	0.85	0.81	0.97	0.03	0.78	0.00	0.48	0.50	0.09	0.04
Avail Cap(c_a), veh/h	584	1718	898	265	1490	464	91	0	438	60	457	683
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.7	31.3	31.6	37.0	51.9	37.5	70.5	0.0	45.0	73.0	43.2	42.7
Incr Delay (d2), s/veh	39.6	3.7	7.5	15.1	16.8	0.0	28.7	0.0	3.7	17.5	0.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	30.3	26.0	28.6	6.1	21.9	0.5	2.9	0.0	7.6	0.5	1.3	0.5
LnGrp Delay(d),s/veh	84.3	35.0	39.1	52.0	68.7	37.5	99.3	0.0	48.7	90.5	43.6	42.8
LnGrp LOS	F	D	D	D	E	D	F		D	F	D	D
Approach Vol, veh/h		2783			1645			267			78	
Approach Delay, s/veh		46.6			66.5			59.5			49.4	
Approach LOS		D			E			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.2	45.3	17.3	79.7	10.6	40.9	49.0	48.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	39.0	16.1	71.9	7.6	36.4	44.5	43.5
Max Q Clear Time (g_c+I1), s	2.8	18.3	12.6	56.8	6.7	4.5	46.5	43.7
Green Ext Time (p_c), s	0.0	1.6	0.2	14.6	0.0	1.8	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	54.2
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	2426	759	0	1739	291	489	0	674	0	0	0
Future Volume (veh/h)	0	2426	759	0	1739	291	489	0	674	0	0	0
Number	7	4	14	3	8	18	5	2	12			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	0	1863	1863	0	1863	1863	1863	1863	1863			
Adj Flow Rate, veh/h	0	2923	0	0	2095	0	876	0	504			
Adj No. of Lanes	0	3	1	0	3	1	2	0	1			
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83			
Percent Heavy Veh, %	0	2	2	0	2	2	2	2	2			
Cap, veh/h	0	2975	926	0	2975	926	1153	0	515			
Arrive On Green	0.00	0.58	0.00	0.00	0.58	0.00	0.33	0.00	0.33			
Sat Flow, veh/h	0	5253	1583	0	5253	1583	3548	0	1583			
Grp Volume(v), veh/h	0	2923	0	0	2095	0	876	0	504			
Grp Sat Flow(s),veh/h/ln	0	1695	1583	0	1695	1583	1774	0	1583			
Q Serve(g_s), s	0.0	56.1	0.0	0.0	29.1	0.0	22.1	0.0	31.5			
Cycle Q Clear(g_c), s	0.0	56.1	0.0	0.0	29.1	0.0	22.1	0.0	31.5			
Prop In Lane	0.00		1.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	0	2975	926	0	2975	926	1153	0	515			
V/C Ratio(X)	0.00	0.98	0.00	0.00	0.70	0.00	0.76	0.00	0.98			
Avail Cap(c_a), veh/h	0	2975	926	0	2975	926	1153	0	515			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	20.3	0.0	0.0	14.6	0.0	30.2	0.0	33.4			
Incr Delay (d2), s/veh	0.0	12.7	0.0	0.0	0.8	0.0	4.7	0.0	34.9			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	29.5	0.0	0.0	13.6	0.0	11.6	0.0	18.7			
LnGrp Delay(d),s/veh	0.0	32.9	0.0	0.0	15.4	0.0	35.0	0.0	68.3			
LnGrp LOS		C			B		C		E			
Approach Vol, veh/h		2923			2095			1380				
Approach Delay, s/veh		32.9			15.4			47.2				
Approach LOS		C			B			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		37.0		63.0				63.0
Change Period (Y+Rc), s		4.5		4.5				4.5
Max Green Setting (Gmax), s		32.5		58.5				58.5
Max Q Clear Time (g_c+I1), s		33.5		58.1				31.1
Green Ext Time (p_c), s		0.0		0.4				27.3

Intersection Summary	
HCM 2010 Ctrl Delay	30.3
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	10	157	28	15	10	176	330	16	10	786	652
Future Volume (veh/h)	160	10	157	28	15	10	176	330	16	10	786	652
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	174	11	171	30	16	11	191	359	17	11	854	709
Adj No. of Lanes	1	1	1	1	2	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	216	284	242	54	129	80	232	2000	94	24	1642	927
Arrive On Green	0.12	0.15	0.15	0.03	0.06	0.06	0.13	0.58	0.58	0.01	0.46	0.46
Sat Flow, veh/h	1774	1863	1583	1774	2100	1302	1774	3441	162	1774	3539	1583
Grp Volume(v), veh/h	174	11	171	30	13	14	191	184	192	11	854	709
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1770	1633	1774	1770	1834	1774	1770	1583
Q Serve(g_s), s	7.7	0.4	8.3	1.4	0.6	0.6	8.5	3.9	4.0	0.5	13.8	27.2
Cycle Q Clear(g_c), s	7.7	0.4	8.3	1.4	0.6	0.6	8.5	3.9	4.0	0.5	13.8	27.2
Prop In Lane	1.00		1.00	1.00		0.80	1.00		0.09	1.00		1.00
Lane Grp Cap(c), veh/h	216	284	242	54	109	100	232	1029	1066	24	1642	927
V/C Ratio(X)	0.81	0.04	0.71	0.56	0.12	0.14	0.82	0.18	0.18	0.46	0.52	0.76
Avail Cap(c_a), veh/h	427	1002	852	138	664	613	366	1029	1066	109	1642	927
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.7	29.3	32.6	38.7	36.0	36.0	34.3	7.9	7.9	39.7	15.3	12.6
Incr Delay (d2), s/veh	7.0	0.1	3.8	8.8	0.5	0.6	8.2	0.4	0.4	13.0	1.2	6.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	0.2	3.9	0.8	0.3	0.3	4.7	2.0	2.1	0.3	7.0	13.3
LnGrp Delay(d),s/veh	41.6	29.3	36.4	47.5	36.5	36.6	42.4	8.3	8.3	52.7	16.5	18.6
LnGrp LOS	D	C	D	D	D	D	D	A	A	D	B	B
Approach Vol, veh/h		356			57			567			1574	
Approach Delay, s/veh		38.7			42.3			19.8			17.7	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.6	51.6	7.0	16.9	15.1	42.1	14.4	9.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	47.1	6.3	43.6	16.7	35.4	19.5	30.4
Max Q Clear Time (g_c+I1), s	2.5	6.0	3.4	10.3	10.5	29.2	9.7	2.6
Green Ext Time (p_c), s	0.0	16.7	0.0	0.8	0.3	4.8	0.3	0.8

Intersection Summary	
HCM 2010 Ctrl Delay	21.7
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	573	197	17	55	87	63	10	209	36	85	495	238
Future Volume (veh/h)	573	197	17	55	87	63	10	209	36	85	495	238
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	573	197	17	55	87	63	10	209	36	85	495	238
Adj No. of Lanes	1	2	1	1	2	1	1	2	1	1	2	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	646	1470	658	86	354	158	23	685	307	109	858	960
Arrive On Green	0.36	0.42	0.42	0.05	0.10	0.10	0.01	0.19	0.19	0.06	0.24	0.24
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	573	197	17	55	87	63	10	209	36	85	495	238
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	19.5	2.2	0.4	2.0	1.5	2.4	0.4	3.2	1.2	3.0	7.9	4.5
Cycle Q Clear(g_c), s	19.5	2.2	0.4	2.0	1.5	2.4	0.4	3.2	1.2	3.0	7.9	4.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	646	1470	658	86	354	158	23	685	307	109	858	960
V/C Ratio(X)	0.89	0.13	0.03	0.64	0.25	0.40	0.44	0.30	0.12	0.78	0.58	0.25
Avail Cap(c_a), veh/h	1121	3214	1438	257	1491	667	138	1529	684	188	1629	1305
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.2	11.6	11.1	29.9	26.6	27.0	31.4	22.1	21.3	29.7	21.4	5.8
Incr Delay (d2), s/veh	4.7	0.0	0.0	7.5	0.4	1.6	13.0	0.2	0.2	11.3	0.6	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.2	1.1	0.2	1.1	0.7	1.1	0.3	1.6	0.5	1.8	3.9	2.0
LnGrp Delay(d),s/veh	23.9	11.6	11.1	37.5	27.0	28.6	44.4	22.4	21.5	41.0	22.0	6.0
LnGrp LOS	C	B	B	D	C	C	D	C	C	D	C	A
Approach Vol, veh/h		787			205			255			818	
Approach Delay, s/veh		20.5			30.3			23.1			19.3	
Approach LOS		C			C			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.4	16.9	7.6	31.1	5.3	20.0	27.8	10.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.8	27.7	9.3	58.2	5.0	29.5	40.5	27.0
Max Q Clear Time (g_c+I1), s	5.0	5.2	4.0	4.2	2.4	9.9	21.5	4.4
Green Ext Time (p_c), s	0.0	5.9	0.0	2.3	0.0	5.6	1.9	2.0

Intersection Summary	
HCM 2010 Ctrl Delay	21.3
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	265	924	132	231	10	800	877	124	10	1635	10
Future Volume (veh/h)	10	265	924	132	231	10	800	877	124	10	1635	10
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	10	265	924	132	231	10	800	877	124	10	1635	10
Adj No. of Lanes	2	2	2	2	2	1	2	3	1	2	3	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	40	471	1084	181	616	276	881	3405	1060	40	2162	673
Arrive On Green	0.01	0.13	0.13	0.05	0.17	0.17	0.26	0.67	0.67	0.01	0.43	0.43
Sat Flow, veh/h	3442	3539	2787	3442	3539	1583	3442	5085	1583	3442	5085	1583
Grp Volume(v), veh/h	10	265	924	132	231	10	800	877	124	10	1635	10
Grp Sat Flow(s),veh/h/ln	1721	1770	1393	1721	1770	1583	1721	1695	1583	1721	1695	1583
Q Serve(g_s), s	0.4	9.5	18.0	5.1	7.8	0.7	30.5	9.3	3.8	0.4	36.8	0.5
Cycle Q Clear(g_c), s	0.4	9.5	18.0	5.1	7.8	0.7	30.5	9.3	3.8	0.4	36.8	0.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	40	471	1084	181	616	276	881	3405	1060	40	2162	673
V/C Ratio(X)	0.25	0.56	0.85	0.73	0.37	0.04	0.91	0.26	0.12	0.25	0.76	0.01
Avail Cap(c_a), veh/h	127	471	1084	216	616	276	1031	3405	1060	127	2162	673
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.2	54.9	37.7	63.1	49.3	46.4	48.8	8.9	8.0	66.2	32.9	22.5
Incr Delay (d2), s/veh	3.2	1.5	6.7	9.7	0.4	0.1	10.5	0.2	0.2	3.2	2.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	4.7	16.7	2.7	3.9	0.3	15.7	4.4	1.7	0.2	17.8	0.2
LnGrp Delay(d),s/veh	69.5	56.4	44.4	72.7	49.7	46.4	59.2	9.1	8.2	69.5	35.4	22.5
LnGrp LOS	E	E	D	E	D	D	E	A	A	E	D	C
Approach Vol, veh/h		1199			373			1801			1655	
Approach Delay, s/veh		47.3			57.8			31.3			35.6	
Approach LOS		D			E			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.1	95.0	11.6	22.5	39.1	62.0	6.1	28.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	90.5	8.5	18.0	40.5	55.0	5.0	21.5
Max Q Clear Time (g_c+I1), s	2.4	11.3	7.1	20.0	32.5	38.8	2.4	9.8
Green Ext Time (p_c), s	0.0	45.5	0.0	0.0	2.1	14.0	0.0	5.8

Intersection Summary	
HCM 2010 Ctrl Delay	38.5
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	131	23	376	98	835	19	1546	1067	672	940	14
Future Volume (veh/h)	10	131	23	376	98	835	19	1546	1067	672	940	14
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	11	142	25	409	107	908	21	1680	1160	730	1022	15
Adj No. of Lanes	1	3	0	2	3	1	1	3	2	2	3	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	22	1171	197	395	1879	585	36	1600	1197	592	2408	35
Arrive On Green	0.01	0.27	0.27	0.11	0.37	0.37	0.02	0.31	0.31	0.17	0.47	0.47
Sat Flow, veh/h	1774	4384	739	3442	5085	1583	1774	5085	2787	3442	5164	76
Grp Volume(v), veh/h	11	108	59	409	107	908	21	1680	1160	730	671	366
Grp Sat Flow(s),veh/h/ln	1774	1695	1732	1721	1695	1583	1774	1695	1393	1721	1695	1849
Q Serve(g_s), s	0.8	3.3	3.5	15.7	1.9	50.5	1.6	43.0	43.0	23.5	18.0	18.0
Cycle Q Clear(g_c), s	0.8	3.3	3.5	15.7	1.9	50.5	1.6	43.0	43.0	23.5	18.0	18.0
Prop In Lane	1.00		0.43	1.00		1.00	1.00		1.00	1.00		0.04
Lane Grp Cap(c), veh/h	22	905	463	395	1879	585	36	1600	1197	592	1581	862
V/C Ratio(X)	0.50	0.12	0.13	1.03	0.06	1.55	0.59	1.05	0.97	1.23	0.42	0.42
Avail Cap(c_a), veh/h	65	987	504	395	1879	585	77	1600	1197	592	1581	862
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	67.1	37.9	38.0	60.5	27.8	43.1	66.4	46.9	38.1	56.6	24.3	24.3
Incr Delay (d2), s/veh	16.2	0.1	0.1	54.5	0.0	257.0	14.5	37.0	19.7	119.4	0.8	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	1.6	1.7	10.4	0.9	63.7	0.9	25.5	24.5	20.9	8.6	9.5
LnGrp Delay(d),s/veh	83.2	38.0	38.1	115.0	27.8	300.1	80.9	83.9	57.8	176.0	25.1	25.8
LnGrp LOS	F	D	D	F	C	F	F	F	E	F	C	C
Approach Vol, veh/h		178			1424			2861			1767	
Approach Delay, s/veh		40.8			226.5			73.3			87.6	
Approach LOS		D			F			E			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	28.0	47.5	20.2	41.0	7.2	68.3	6.2	55.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	23.5	43.0	15.7	39.8	5.9	60.6	5.0	50.5
Max Q Clear Time (g_c+I1), s	25.5	45.0	17.7	5.5	3.6	20.0	2.8	52.5
Green Ext Time (p_c), s	0.0	0.0	0.0	7.1	0.0	36.6	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	111.4
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	320	1637	83	657	1237	549	194	787	660	614	460	124
Future Volume (veh/h)	320	1637	83	657	1237	549	194	787	660	614	460	124
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	360	1839	93	738	1390	617	218	884	742	690	517	139
Adj No. of Lanes	2	4	1	2	3	1	2	2	2	2	2	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	406	1645	406	608	1603	758	267	1003	790	562	1020	273
Arrive On Green	0.12	0.26	0.26	0.18	0.32	0.32	0.08	0.28	0.28	0.16	0.37	0.37
Sat Flow, veh/h	3442	6408	1583	3442	5085	1583	3442	3539	2787	3442	2763	739
Grp Volume(v), veh/h	360	1839	93	738	1390	617	218	884	742	690	330	326
Grp Sat Flow(s),veh/h/ln	1721	1602	1583	1721	1695	1583	1721	1770	1393	1721	1770	1732
Q Serve(g_s), s	15.5	38.5	7.0	26.5	38.6	47.3	9.4	35.8	39.0	24.5	21.7	21.9
Cycle Q Clear(g_c), s	15.5	38.5	7.0	26.5	38.6	47.3	9.4	35.8	39.0	24.5	21.7	21.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.43
Lane Grp Cap(c), veh/h	406	1645	406	608	1603	758	267	1003	790	562	653	640
V/C Ratio(X)	0.89	1.12	0.23	1.21	0.87	0.81	0.82	0.88	0.94	1.23	0.51	0.51
Avail Cap(c_a), veh/h	441	1645	406	608	1603	758	356	1003	790	562	653	640
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	65.2	55.8	44.0	61.8	48.4	33.4	68.1	51.3	52.5	62.8	36.7	36.8
Incr Delay (d2), s/veh	18.2	62.0	0.3	110.8	5.3	6.8	10.5	11.1	20.3	117.4	2.8	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.4	24.1	3.1	21.9	18.9	23.2	4.8	19.0	17.2	20.8	11.1	11.0
LnGrp Delay(d),s/veh	83.3	117.8	44.3	172.5	53.7	40.2	78.7	62.4	72.8	180.2	39.5	39.6
LnGrp LOS	F	F	D	F	D	D	E	E	E	F	D	D
Approach Vol, veh/h		2292			2745			1844			1346	
Approach Delay, s/veh		109.4			82.6			68.5			111.6	
Approach LOS		F			F			E			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	29.0	47.0	31.0	43.0	16.1	59.9	22.2	51.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	24.5	42.5	26.5	38.5	15.5	51.5	19.2	45.8
Max Q Clear Time (g_c+I1), s	26.5	41.0	28.5	40.5	11.4	23.9	17.5	49.3
Green Ext Time (p_c), s	0.0	1.4	0.0	0.0	0.3	17.2	0.3	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	91.7
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	203	67	49	10	143	484	77	2901	10	225	2121	115
Future Volume (veh/h)	203	67	49	10	143	484	77	2901	10	225	2121	115
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	221	73	53	11	155	526	84	3153	11	245	2305	125
Adj No. of Lanes	1	3	0	1	3	1	1	3	0	2	3	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	248	962	449	22	795	344	100	2693	9	209	2564	138
Arrive On Green	0.14	0.28	0.28	0.01	0.16	0.16	0.06	0.51	0.51	0.06	0.52	0.52
Sat Flow, veh/h	1774	3390	1583	1774	5085	1583	1774	5231	18	3442	4940	266
Grp Volume(v), veh/h	221	73	53	11	155	526	84	2042	1122	245	1576	854
Grp Sat Flow(s),veh/h/ln	1774	1695	1583	1774	1695	1583	1774	1695	1860	1721	1695	1816
Q Serve(g_s), s	17.1	2.2	3.5	0.9	3.7	21.9	6.6	72.1	72.1	8.5	58.6	59.8
Cycle Q Clear(g_c), s	17.1	2.2	3.5	0.9	3.7	21.9	6.6	72.1	72.1	8.5	58.6	59.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.01	1.00		0.15
Lane Grp Cap(c), veh/h	248	962	449	22	795	344	100	1745	957	209	1759	942
V/C Ratio(X)	0.89	0.08	0.12	0.50	0.19	1.53	0.84	1.17	1.17	1.17	0.90	0.91
Avail Cap(c_a), veh/h	374	1123	524	63	795	344	100	1745	957	209	1759	942
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	59.2	36.7	37.2	68.7	51.4	54.8	65.5	34.0	34.0	65.8	30.3	30.6
Incr Delay (d2), s/veh	16.1	0.0	0.1	16.4	0.1	253.1	43.9	83.2	88.7	116.9	7.6	13.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.5	1.0	1.5	0.5	1.7	37.5	4.4	53.8	60.5	7.4	29.2	33.5
LnGrp Delay(d),s/veh	75.3	36.8	37.3	85.1	51.5	308.0	109.3	117.2	122.7	182.7	37.9	44.5
LnGrp LOS	E	D	D	F	D	F	F	F	F	F	D	D
Approach Vol, veh/h		347			692			3248			2675	
Approach Delay, s/veh		61.4			247.0			118.9			53.2	
Approach LOS		E			F			F			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.0	76.6	6.2	44.2	12.4	77.2	24.1	26.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	8.5	72.1	5.0	46.4	7.9	72.7	29.5	21.9
Max Q Clear Time (g_c+I1), s	10.5	74.1	2.9	5.5	8.6	61.8	19.1	23.9
Green Ext Time (p_c), s	0.0	0.0	0.0	4.3	0.0	10.9	0.4	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	103.5
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	339	496	403	375	219	115	227	337	385	190	269	171
Future Volume (veh/h)	339	496	403	375	219	115	227	337	385	190	269	171
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	339	496	403	375	219	115	227	337	385	190	269	171
Adj No. of Lanes	1	2	1	1	2	0	1	2	1	1	2	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	370	708	545	406	501	253	256	1108	496	217	613	378
Arrive On Green	0.21	0.20	0.20	0.23	0.22	0.22	0.14	0.31	0.31	0.12	0.29	0.29
Sat Flow, veh/h	1774	3539	1583	1774	2277	1152	1774	3539	1583	1774	2106	1297
Grp Volume(v), veh/h	339	496	403	375	168	166	227	337	385	190	225	215
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1659	1774	1770	1583	1774	1770	1634
Q Serve(g_s), s	24.8	17.3	26.5	27.4	10.9	11.5	16.6	9.6	29.3	14.0	13.7	14.3
Cycle Q Clear(g_c), s	24.8	17.3	26.5	27.4	10.9	11.5	16.6	9.6	29.3	14.0	13.7	14.3
Prop In Lane	1.00		1.00	1.00		0.69	1.00		1.00	1.00		0.79
Lane Grp Cap(c), veh/h	370	708	545	406	389	365	256	1108	496	217	515	476
V/C Ratio(X)	0.92	0.70	0.74	0.92	0.43	0.45	0.89	0.30	0.78	0.88	0.44	0.45
Avail Cap(c_a), veh/h	559	708	545	555	389	365	403	1108	496	301	515	476
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.3	49.3	38.2	50.0	44.6	44.8	55.7	34.6	41.3	57.2	38.2	38.4
Incr Delay (d2), s/veh	14.5	3.1	5.3	17.4	0.8	0.9	13.7	0.7	11.3	18.5	2.7	3.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.6	8.8	13.8	15.4	5.4	5.3	9.2	4.8	14.3	8.0	7.1	6.9
LnGrp Delay(d),s/veh	65.8	52.4	43.5	67.4	45.3	45.7	69.4	35.3	52.7	75.7	40.8	41.5
LnGrp LOS	E	D	D	E	D	D	E	D	D	E	D	D
Approach Vol, veh/h		1238			709			949			630	
Approach Delay, s/veh		53.2			57.1			50.5			51.6	
Approach LOS		D			E			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.7	46.0	34.8	31.0	23.6	43.1	32.2	33.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	22.5	41.5	41.5	26.5	30.1	33.9	41.8	26.2
Max Q Clear Time (g_c+I1), s	16.0	31.3	29.4	28.5	18.6	16.3	26.8	13.5
Green Ext Time (p_c), s	0.3	4.6	0.9	0.0	0.5	6.2	0.9	5.6

Intersection Summary	
HCM 2010 Ctrl Delay	53.0
HCM 2010 LOS	D

7: California Oaks Rd & Clinton Keith Rd

Timing Plan: PM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1364	318	807	1619	217	765
Future Volume (vph)	1364	318	807	1619	217	765
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5	4.5	4.5	4.5
Lane Util. Factor	0.91		0.97	0.91	1.00	0.88
Frt	0.97		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	4941		3433	5085	1770	2787
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	4941		3433	5085	1770	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1436	335	849	1704	228	805
RTOR Reduction (vph)	27	0	0	0	0	609
Lane Group Flow (vph)	1744	0	849	1704	228	196
Turn Type	NA		Prot	NA	Perm	Perm
Protected Phases	4		3	8		
Permitted Phases					2	2
Actuated Green, G (s)	53.0		37.4	94.9	33.5	33.5
Effective Green, g (s)	53.0		37.4	94.9	33.5	33.5
Actuated g/C Ratio	0.39		0.27	0.69	0.24	0.24
Clearance Time (s)	4.5		4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1905		934	3512	431	679
v/s Ratio Prot	c0.35		c0.25	0.34		
v/s Ratio Perm					c0.13	0.07
v/c Ratio	0.92		0.91	0.49	0.53	0.29
Uniform Delay, d1	40.1		48.4	9.9	45.1	42.3
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	7.3		12.4	0.1	4.6	1.1
Delay (s)	47.4		60.8	10.0	49.7	43.3
Level of Service	D		E	A	D	D
Approach Delay (s)	47.4			26.9	44.7	
Approach LOS	D			C	D	

Intersection Summary			
HCM 2000 Control Delay	37.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	137.4	Sum of lost time (s)	13.5
Intersection Capacity Utilization	79.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	561	340	185	489	561	724	1194	506	295	855	22
Future Volume (veh/h)	14	561	340	185	489	561	724	1194	506	295	855	22
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	15	616	374	203	537	616	796	1312	556	324	940	24
Adj No. of Lanes	1	3	1	1	2	1	2	3	1	2	3	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	186	1394	434	289	1187	531	862	2069	644	376	1355	35
Arrive On Green	0.02	0.27	0.27	0.08	0.34	0.34	0.25	0.41	0.41	0.11	0.27	0.27
Sat Flow, veh/h	1774	5085	1583	1774	3539	1583	3442	5085	1583	3442	5100	130
Grp Volume(v), veh/h	15	616	374	203	537	616	796	1312	556	324	625	339
Grp Sat Flow(s),veh/h/ln	1774	1695	1583	1774	1770	1583	1721	1695	1583	1721	1695	1840
Q Serve(g_s), s	0.8	13.6	30.5	10.5	16.2	45.6	30.6	28.0	43.6	12.6	22.5	22.6
Cycle Q Clear(g_c), s	0.8	13.6	30.5	10.5	16.2	45.6	30.6	28.0	43.6	12.6	22.5	22.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.07
Lane Grp Cap(c), veh/h	186	1394	434	289	1187	531	862	2069	644	376	901	489
V/C Ratio(X)	0.08	0.44	0.86	0.70	0.45	1.16	0.92	0.63	0.86	0.86	0.69	0.69
Avail Cap(c_a), veh/h	223	1478	460	289	1187	531	935	2069	644	423	901	489
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.8	40.7	46.9	33.1	35.4	45.2	49.7	32.2	36.8	59.5	44.9	44.9
Incr Delay (d2), s/veh	0.2	0.2	14.7	7.5	0.3	91.2	13.8	1.5	14.3	15.2	4.4	7.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	6.4	15.1	2.3	8.0	33.4	16.2	13.4	21.6	6.8	11.1	12.6
LnGrp Delay(d),s/veh	35.0	41.0	61.6	40.6	35.6	136.4	63.5	33.7	51.1	74.7	49.3	52.8
LnGrp LOS	C	D	E	D	D	F	E	C	D	E	D	D
Approach Vol, veh/h		1005			1356			2664			1288	
Approach Delay, s/veh		48.6			82.1			46.2			56.6	
Approach LOS		D			F			D			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.3	59.8	15.0	41.8	38.5	40.6	6.7	50.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	16.7	55.3	10.5	39.5	36.9	35.1	5.0	45.0
Max Q Clear Time (g_c+I1), s	14.6	45.6	12.5	32.5	32.6	24.6	2.8	47.6
Green Ext Time (p_c), s	0.3	8.7	0.0	4.7	1.4	9.4	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	56.4
HCM 2010 LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	176	2070	89	113	2008	442	75	388	216	467	198	121
Future Volume (veh/h)	176	2070	89	113	2008	442	75	388	216	467	198	121
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	187	2202	95	120	2136	470	80	413	230	497	211	129
Adj No. of Lanes	1	3	0	1	3	1	1	2	1	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	148	1850	79	101	1746	544	100	861	385	373	854	500
Arrive On Green	0.08	0.37	0.37	0.06	0.34	0.34	0.06	0.24	0.24	0.21	0.40	0.40
Sat Flow, veh/h	1774	5000	215	1774	5085	1583	1774	3539	1583	1774	2150	1260
Grp Volume(v), veh/h	187	1490	807	120	2136	470	80	413	230	497	172	168
Grp Sat Flow(s),veh/h/ln	1774	1695	1825	1774	1695	1583	1774	1770	1583	1774	1770	1640
Q Serve(g_s), s	12.5	55.5	55.5	8.5	51.5	41.6	6.7	15.0	19.3	31.5	9.7	10.3
Cycle Q Clear(g_c), s	12.5	55.5	55.5	8.5	51.5	41.6	6.7	15.0	19.3	31.5	9.7	10.3
Prop In Lane	1.00		0.12	1.00		1.00	1.00		1.00	1.00		0.77
Lane Grp Cap(c), veh/h	148	1254	675	101	1746	544	100	861	385	373	703	651
V/C Ratio(X)	1.26	1.19	1.20	1.19	1.22	0.86	0.80	0.48	0.60	1.33	0.24	0.26
Avail Cap(c_a), veh/h	148	1254	675	101	1746	544	157	861	385	373	703	651
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	68.8	47.3	47.3	70.8	49.3	46.0	70.0	48.6	50.2	59.3	30.2	30.4
Incr Delay (d2), s/veh	162.0	92.7	102.1	150.9	105.9	13.6	14.5	1.9	6.7	167.6	0.8	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.8	42.1	47.1	8.4	41.2	20.3	3.7	7.6	9.2	32.8	4.9	4.8
LnGrp Delay(d),s/veh	230.7	140.0	149.3	221.6	155.1	59.6	84.4	50.5	56.9	226.9	31.0	31.3
LnGrp LOS	F	F	F	F	F	E	F	D	E	F	C	C
Approach Vol, veh/h		2484			2726			723			837	
Approach Delay, s/veh		149.8			141.6			56.3			147.4	
Approach LOS		F			F			E			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	36.0	41.0	13.0	60.0	12.9	64.1	17.0	56.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	31.5	36.5	8.5	55.5	13.3	54.7	12.5	51.5
Max Q Clear Time (g_c+I1), s	33.5	21.3	10.5	57.5	8.7	12.3	14.5	53.5
Green Ext Time (p_c), s	0.0	5.1	0.0	0.0	0.1	6.7	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	136.2
HCM 2010 LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	139	842	82	796	820	126	139	195	640	128	49	140
Future Volume (veh/h)	139	842	82	796	820	126	139	195	640	128	49	140
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	148	896	87	847	872	134	148	207	681	136	52	149
Adj No. of Lanes	1	3	0	2	3	0	1	1	1	1	2	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	179	1243	120	962	1968	301	376	620	969	222	589	527
Arrive On Green	0.10	0.26	0.26	0.28	0.44	0.44	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	1774	4716	456	3442	4452	681	1177	1863	1583	623	1770	1583
Grp Volume(v), veh/h	148	643	340	847	663	343	148	207	681	136	52	149
Grp Sat Flow(s),veh/h/ln	1774	1695	1782	1721	1695	1743	1177	1863	1583	623	1770	1583
Q Serve(g_s), s	8.9	18.7	18.8	25.5	14.7	14.8	11.5	9.1	31.8	22.7	2.2	7.5
Cycle Q Clear(g_c), s	8.9	18.7	18.8	25.5	14.7	14.8	19.0	9.1	31.8	31.8	2.2	7.5
Prop In Lane	1.00		0.26	1.00		0.39	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	179	893	470	962	1498	770	376	620	969	222	589	527
V/C Ratio(X)	0.83	0.72	0.72	0.88	0.44	0.45	0.39	0.33	0.70	0.61	0.09	0.28
Avail Cap(c_a), veh/h	299	962	506	1256	1628	837	376	620	969	222	589	527
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.8	36.3	36.4	37.4	21.0	21.0	33.7	27.2	14.3	39.1	24.9	26.7
Incr Delay (d2), s/veh	9.2	2.4	4.7	6.1	0.2	0.4	3.1	1.5	4.3	12.1	0.3	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	9.1	9.9	12.9	6.9	7.2	4.1	4.9	15.0	4.6	1.1	3.5
LnGrp Delay(d),s/veh	57.1	38.8	41.0	43.5	21.2	21.4	36.8	28.6	18.6	51.2	25.2	28.0
LnGrp LOS	E	D	D	D	C	C	D	C	B	D	C	C
Approach Vol, veh/h		1131			1853			1036			337	
Approach Delay, s/veh		41.8			31.4			23.2			36.9	
Approach LOS		D			C			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		40.6	34.8	33.1		40.6	15.5	52.5
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		36.1	39.6	30.8		36.1	18.3	52.1
Max Q Clear Time (g_c+I1), s		33.8	27.5	20.8		33.8	10.9	16.8
Green Ext Time (p_c), s		1.6	2.8	7.8		1.6	0.2	19.1

Intersection Summary	
HCM 2010 Ctrl Delay	32.6
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	398	1870	27	137	1957	10	33	10	115	10	10	617
Future Volume (veh/h)	398	1870	27	137	1957	10	33	10	115	10	10	617
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	415	1948	28	143	2039	10	34	10	120	10	10	643
Adj No. of Lanes	1	3	0	1	3	1	1	1	0	1	1	2
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	408	2797	40	217	2039	635	45	32	388	20	463	692
Arrive On Green	0.20	0.54	0.54	0.06	0.40	0.40	0.03	0.26	0.26	0.01	0.25	0.25
Sat Flow, veh/h	1774	5166	74	1774	5085	1583	1774	123	1479	1774	1863	2787
Grp Volume(v), veh/h	415	1278	698	143	2039	10	34	0	130	10	10	643
Grp Sat Flow(s),veh/h/ln	1774	1695	1850	1774	1695	1583	1774	0	1602	1774	1863	1393
Q Serve(g_s), s	29.7	40.7	40.8	6.9	58.8	0.6	2.8	0.0	9.6	0.8	0.6	33.1
Cycle Q Clear(g_c), s	29.7	40.7	40.8	6.9	58.8	0.6	2.8	0.0	9.6	0.8	0.6	33.1
Prop In Lane	1.00		0.04	1.00		1.00	1.00		0.92	1.00		1.00
Lane Grp Cap(c), veh/h	408	1835	1001	217	2039	635	45	0	420	20	463	692
V/C Ratio(X)	1.02	0.70	0.70	0.66	1.00	0.02	0.75	0.00	0.31	0.49	0.02	0.93
Avail Cap(c_a), veh/h	408	1835	1001	316	2039	635	86	0	420	60	463	692
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.9	24.8	24.8	27.0	43.9	26.5	71.0	0.0	43.4	72.1	41.7	53.9
Incr Delay (d2), s/veh	48.7	1.2	2.1	3.4	20.0	0.0	21.6	0.0	1.9	17.4	0.1	20.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	22.0	19.3	21.3	3.6	31.1	0.2	1.6	0.0	4.4	0.5	0.3	14.7
LnGrp Delay(d),s/veh	98.7	25.9	26.9	30.4	63.9	26.5	92.6	0.0	45.3	89.5	41.7	74.5
LnGrp LOS	F	C	C	C	F	C	F		D	F	D	E
Approach Vol, veh/h		2391			2192			164			663	
Approach Delay, s/veh		38.8			61.6			55.1			74.3	
Approach LOS		D			E			E			E	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.2	43.0	13.6	83.9	8.2	40.9	34.2	63.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	38.5	17.3	71.2	7.1	36.4	29.7	58.8
Max Q Clear Time (g_c+I1), s	2.8	11.6	8.9	42.8	4.8	35.1	31.7	60.8
Green Ext Time (p_c), s	0.0	3.8	0.2	27.5	0.0	0.6	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	52.9
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1656	533	0	2027	93	576	0	599	0	0	0
Future Volume (veh/h)	0	1656	533	0	2027	93	576	0	599	0	0	0
Number	7	4	14	3	8	18	5	2	12			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	0	1863	1863	0	1863	1863	1863	1863	1863			
Adj Flow Rate, veh/h	0	1995	0	0	2442	0	923	0	477			
Adj No. of Lanes	0	3	1	0	3	1	2	0	1			
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83			
Percent Heavy Veh, %	0	2	2	0	2	2	2	2	2			
Cap, veh/h	0	2669	831	0	2669	831	1366	0	610			
Arrive On Green	0.00	0.52	0.00	0.00	0.52	0.00	0.39	0.00	0.39			
Sat Flow, veh/h	0	5253	1583	0	5253	1583	3548	0	1583			
Grp Volume(v), veh/h	0	1995	0	0	2442	0	923	0	477			
Grp Sat Flow(s),veh/h/ln	0	1695	1583	0	1695	1583	1774	0	1583			
Q Serve(g_s), s	0.0	30.7	0.0	0.0	43.9	0.0	21.6	0.0	26.5			
Cycle Q Clear(g_c), s	0.0	30.7	0.0	0.0	43.9	0.0	21.6	0.0	26.5			
Prop In Lane	0.00		1.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	0	2669	831	0	2669	831	1366	0	610			
V/C Ratio(X)	0.00	0.75	0.00	0.00	0.91	0.00	0.68	0.00	0.78			
Avail Cap(c_a), veh/h	0	2671	831	0	2671	831	1366	0	610			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	18.6	0.0	0.0	21.7	0.0	25.5	0.0	27.0			
Incr Delay (d2), s/veh	0.0	1.2	0.0	0.0	5.5	0.0	2.7	0.0	9.7			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	14.5	0.0	0.0	21.7	0.0	11.0	0.0	13.2			
LnGrp Delay(d),s/veh	0.0	19.8	0.0	0.0	27.2	0.0	28.2	0.0	36.7			
LnGrp LOS		B			C		C		D			
Approach Vol, veh/h		1995			2442			1400				
Approach Delay, s/veh		19.8			27.2			31.1				
Approach LOS		B			C			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		43.0		57.0				57.0
Change Period (Y+Rc), s		4.5		4.5				4.5
Max Green Setting (Gmax), s		38.5		52.5				52.5
Max Q Clear Time (g_c+I1), s		28.5		32.7				45.9
Green Ext Time (p_c), s		4.2		19.6				6.6

Intersection Summary	
HCM 2010 Ctrl Delay	25.6
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	598	14	469	15	12	10	251	984	22	10	407	466
Future Volume (veh/h)	598	14	469	15	12	10	251	984	22	10	407	466
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	650	15	510	16	13	11	273	1070	24	11	442	507
Adj No. of Lanes	1	1	1	1	2	0	1	2	0	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	549	655	557	32	117	87	251	1515	34	24	1061	965
Arrive On Green	0.31	0.35	0.35	0.02	0.06	0.06	0.14	0.43	0.43	0.01	0.30	0.30
Sat Flow, veh/h	1774	1863	1583	1774	1935	1443	1774	3539	79	1774	3539	1583
Grp Volume(v), veh/h	650	15	510	16	12	12	273	535	559	11	442	507
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1770	1608	1774	1770	1849	1774	1770	1583
Q Serve(g_s), s	29.5	0.5	29.4	0.9	0.6	0.7	13.5	23.6	23.6	0.6	9.5	17.6
Cycle Q Clear(g_c), s	29.5	0.5	29.4	0.9	0.6	0.7	13.5	23.6	23.6	0.6	9.5	17.6
Prop In Lane	1.00		1.00	1.00		0.90	1.00		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	549	655	557	32	107	97	251	758	792	24	1061	965
V/C Ratio(X)	1.18	0.02	0.92	0.50	0.11	0.13	1.09	0.71	0.71	0.47	0.42	0.53
Avail Cap(c_a), veh/h	549	1066	907	99	564	513	251	758	792	93	1061	965
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.9	20.2	29.6	46.4	42.4	42.4	40.9	22.3	22.3	46.7	26.7	10.7
Incr Delay (d2), s/veh	100.4	0.0	8.9	11.4	0.4	0.6	82.0	5.5	5.3	13.8	1.2	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	29.6	0.3	14.1	0.5	0.3	0.3	12.3	12.6	13.1	0.4	4.8	8.2
LnGrp Delay(d),s/veh	133.4	20.2	38.5	57.8	42.8	43.0	122.9	27.8	27.6	60.5	27.9	12.8
LnGrp LOS	F	C	D	E	D	D	F	C	C	E	C	B
Approach Vol, veh/h		1175			40			1367			960	
Approach Delay, s/veh		90.7			48.9			46.7			20.3	
Approach LOS		F			D			D			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.8	45.3	6.2	38.0	18.0	33.1	34.0	10.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	37.1	5.3	54.6	13.5	28.6	29.5	30.4
Max Q Clear Time (g_c+I1), s	2.6	25.6	2.9	31.4	15.5	19.6	31.5	2.7
Green Ext Time (p_c), s	0.0	8.4	0.0	2.2	0.0	6.9	0.0	2.2

Intersection Summary	
HCM 2010 Ctrl Delay	54.2
HCM 2010 LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	559	264	14	62	195	139	10	267	53	124	269	676
Future Volume (veh/h)	559	264	14	62	195	139	10	267	53	124	269	676
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	559	264	14	62	195	139	10	267	53	124	269	676
Adj No. of Lanes	1	2	1	1	2	1	1	2	1	1	2	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	603	1537	688	80	494	221	22	846	379	154	1110	1034
Arrive On Green	0.34	0.43	0.43	0.05	0.14	0.14	0.01	0.24	0.24	0.09	0.31	0.31
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	559	264	14	62	195	139	10	267	53	124	269	676
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	28.1	4.2	0.5	3.2	4.6	7.7	0.5	5.7	2.4	6.3	5.2	23.9
Cycle Q Clear(g_c), s	28.1	4.2	0.5	3.2	4.6	7.7	0.5	5.7	2.4	6.3	5.2	23.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	603	1537	688	80	494	221	22	846	379	154	1110	1034
V/C Ratio(X)	0.93	0.17	0.02	0.78	0.39	0.63	0.46	0.32	0.14	0.81	0.24	0.65
Avail Cap(c_a), veh/h	739	2137	956	186	1034	463	96	1053	471	173	1206	1078
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.4	16.0	14.9	43.7	36.2	37.5	45.3	28.9	27.7	41.4	23.6	9.7
Incr Delay (d2), s/veh	15.9	0.1	0.0	14.6	0.5	2.9	14.4	0.2	0.2	21.7	0.1	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	16.3	2.1	0.2	1.9	2.3	3.5	0.3	2.8	1.1	4.0	2.6	10.7
LnGrp Delay(d),s/veh	45.3	16.0	14.9	58.3	36.7	40.4	59.7	29.2	27.9	63.2	23.7	11.0
LnGrp LOS	D	B	B	E	D	D	E	C	C	E	C	B
Approach Vol, veh/h		837			396			330			1069	
Approach Delay, s/veh		35.5			41.4			29.9			20.3	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.5	26.6	8.7	44.6	5.6	33.5	35.9	17.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.0	27.5	9.7	55.8	5.0	31.5	38.5	27.0
Max Q Clear Time (g_c+I1), s	8.3	7.7	5.2	6.2	2.5	25.9	30.1	9.7
Green Ext Time (p_c), s	0.0	6.7	0.0	3.9	0.0	3.1	1.3	3.3

Intersection Summary	
HCM 2010 Ctrl Delay	29.5
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	325	1181	164	366	10	1231	1777	181	10	1107	10
Future Volume (veh/h)	10	325	1181	164	366	10	1231	1777	181	10	1107	10
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	10	325	1181	164	366	10	1231	1777	181	10	1107	10
Adj No. of Lanes	2	2	2	2	2	1	2	3	1	2	3	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	40	483	1453	213	662	296	1324	3341	1040	40	1443	449
Arrive On Green	0.01	0.14	0.14	0.06	0.19	0.19	0.38	0.66	0.66	0.01	0.28	0.28
Sat Flow, veh/h	3442	3539	2787	3442	3539	1583	3442	5085	1583	3442	5085	1583
Grp Volume(v), veh/h	10	325	1181	164	366	10	1231	1777	181	10	1107	10
Grp Sat Flow(s),veh/h/ln	1721	1770	1393	1721	1770	1583	1721	1695	1583	1721	1695	1583
Q Serve(g_s), s	0.4	11.8	18.5	6.4	12.7	0.7	46.4	25.0	6.0	0.4	27.0	0.6
Cycle Q Clear(g_c), s	0.4	11.8	18.5	6.4	12.7	0.7	46.4	25.0	6.0	0.4	27.0	0.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	40	483	1453	213	662	296	1324	3341	1040	40	1443	449
V/C Ratio(X)	0.25	0.67	0.81	0.77	0.55	0.03	0.93	0.53	0.17	0.25	0.77	0.02
Avail Cap(c_a), veh/h	127	483	1453	241	662	296	1461	3341	1040	127	1443	449
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.4	55.6	26.9	62.6	49.9	45.1	39.9	12.2	9.0	66.4	44.4	35.0
Incr Delay (d2), s/veh	3.2	3.6	3.6	12.5	1.0	0.0	10.2	0.6	0.4	3.2	4.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	6.0	18.9	3.4	6.3	0.3	23.9	11.7	2.7	0.2	13.1	0.3
LnGrp Delay(d),s/veh	69.6	59.2	30.6	75.0	50.9	45.1	50.1	12.9	9.4	69.6	48.4	35.1
LnGrp LOS	E	E	C	E	D	D	D	B	A	E	D	D
Approach Vol, veh/h		1516			540			3189			1127	
Approach Delay, s/veh		37.0			58.2			27.1			48.4	
Approach LOS		D			E			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.1	93.5	12.9	23.0	56.6	42.9	6.1	29.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	89.0	9.5	18.5	57.5	36.5	5.0	23.0
Max Q Clear Time (g_c+I1), s	2.4	27.0	8.4	20.5	48.4	29.0	2.4	14.7
Green Ext Time (p_c), s	0.0	47.1	0.1	0.0	3.7	7.2	0.0	5.8

Intersection Summary	
HCM 2010 Ctrl Delay	35.8
HCM 2010 LOS	D

PHASINGS, TIMINGS, CYCLE LENGTH OUTPUTS

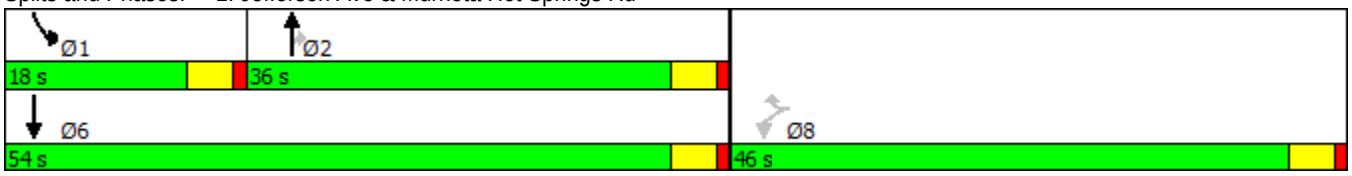
EXISTING CONDITIONS

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	593	233	150	231	220	539
Future Volume (vph)	593	233	150	231	220	539
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	265		280	185	
Storage Lanes	2	1		1	2	
Taper Length (ft)	25				25	
Lane Util. Factor	0.97	1.00	0.91	1.00	0.97	0.95
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3433	1583	5085	1583	3433	3539
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	3433	1583	5085	1583	3433	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		253		251		
Link Speed (mph)	30		30			30
Link Distance (ft)	1412		1630			2768
Travel Time (s)	32.1		37.0			62.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	645	253	163	251	239	586
Shared Lane Traffic (%)						
Lane Group Flow (vph)	645	253	163	251	239	586
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	48		24			24
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (ft)	20	20	100	20	20	100
Trailing Detector (ft)	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0
Detector 1 Size(ft)	20	20	6	20	20	6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)			94			94
Detector 2 Size(ft)			6			6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	Perm	NA	Perm	Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	44.4	44.4	33.8	33.8	9.5	22.5
Total Split (s)	46.0	46.0	36.0	36.0	18.0	54.0
Total Split (%)	46.0%	46.0%	36.0%	36.0%	18.0%	54.0%
Maximum Green (s)	41.5	41.5	31.5	31.5	13.5	49.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max
Walk Time (s)	7.0	7.0	7.0	7.0		
Flash Dont Walk (s)	32.9	32.9	22.3	22.3		
Pedestrian Calls (#/hr)	0	0	0	0		
Act Effct Green (s)	21.0	21.0	34.5	34.5	10.6	49.7
Actuated g/C Ratio	0.26	0.26	0.43	0.43	0.13	0.62
v/c Ratio	0.71	0.42	0.07	0.30	0.52	0.27
Control Delay	31.3	5.4	15.1	3.7	36.9	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.3	5.4	15.1	3.7	36.9	7.8
LOS	C	A	B	A	D	A
Approach Delay	24.0		8.2			16.2
Approach LOS	C		A			B

Intersection Summary	
Area Type: Other	
Cycle Length: 100	
Actuated Cycle Length: 79.7	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.71	
Intersection Signal Delay: 17.9	Intersection LOS: B
Intersection Capacity Utilization 39.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Jefferson Ave & Murrieta Hot Springs Rd

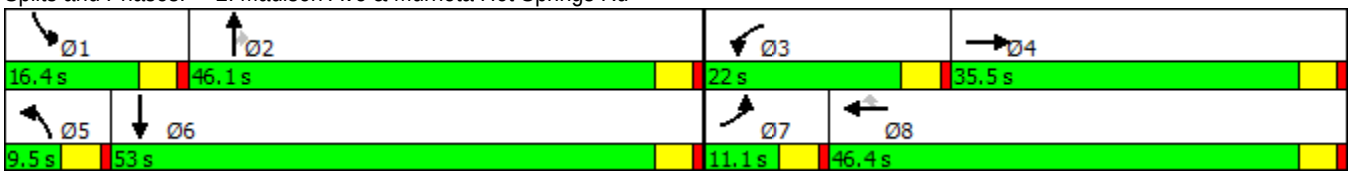


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	343	59	417	615	224	20	78	207	278	173	89
Future Volume (vph)	70	343	59	417	615	224	20	78	207	278	173	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	250		0	100		100	165		0
Storage Lanes	2		0	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.86	0.86	0.97	0.91	1.00	0.97	0.91	0.91	0.97	0.95	0.95
Frt		0.978				0.850		0.914	0.850		0.949	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	6267	0	3433	5085	1583	3433	3099	1441	3433	3359	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	6267	0	3433	5085	1583	3433	3099	1441	3433	3359	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		35				252		117	177		92	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1412			2198			1707			1381	
Travel Time (s)		32.1			50.0			38.8			31.4	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	79	385	66	469	691	252	22	88	233	312	194	100
Shared Lane Traffic (%)									50%			
Lane Group Flow (vph)	79	451	0	469	691	252	22	205	116	312	294	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	35.5		9.5	38.4	38.4	9.5	45.2	45.2	9.5	45.2	
Total Split (s)	11.1	35.5		22.0	46.4	46.4	9.5	46.1	46.1	16.4	53.0	
Total Split (%)	9.3%	29.6%		18.3%	38.7%	38.7%	7.9%	38.4%	38.4%	13.7%	44.2%	
Maximum Green (s)	6.6	31.0		17.5	41.9	41.9	5.0	41.6	41.6	11.9	48.5	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		24.0			26.9	26.9		33.7	33.7		33.7	
Pedestrian Calls (#/hr)		0			0	0		0	0		0	
Act Effct Green (s)	6.5	12.9		17.3	25.9	25.9	5.0	41.6	41.6	11.9	54.4	
Actuated g/C Ratio	0.06	0.13		0.17	0.25	0.25	0.05	0.41	0.41	0.12	0.53	
v/c Ratio	0.36	0.55		0.81	0.53	0.43	0.13	0.15	0.17	0.78	0.16	
Control Delay	51.5	40.8		52.9	35.0	6.4	49.5	9.1	1.2	58.6	9.6	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	51.5	40.8		52.9	35.0	6.4	49.5	9.1	1.2	58.6	9.6	
LOS	D	D		D	C	A	D	A	A	E	A	
Approach Delay		42.4			35.8			9.0			34.8	
Approach LOS		D			D			A			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 101.7	
Natural Cycle: 115	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.81	
Intersection Signal Delay: 33.6	Intersection LOS: C
Intersection Capacity Utilization 45.2%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: Madison Ave & Murrieta Hot Springs Rd

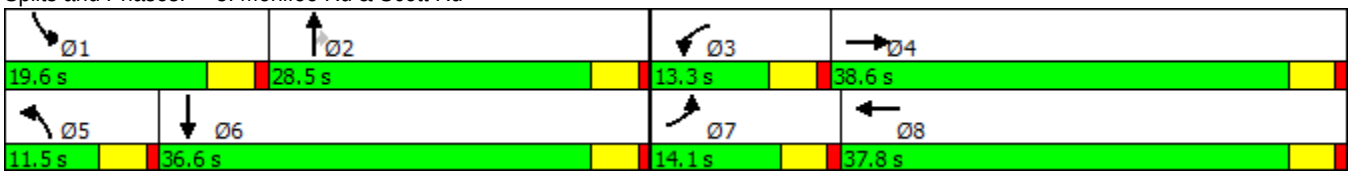


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	71	418	69	100	513	162	76	188	118	133	313	87
Future Volume (vph)	71	418	69	100	513	162	76	188	118	133	313	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	195		0	155		0	150		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.979			0.964				0.850		0.967	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3465	0	1770	3412	0	1770	1863	1583	1770	1801	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3465	0	1770	3412	0	1770	1863	1583	1770	1801	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20			45				164		15	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		804			428			403			545	
Travel Time (s)		18.3			9.7			9.2			12.4	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	72	422	70	101	518	164	77	190	119	134	316	88
Shared Lane Traffic (%)												
Lane Group Flow (vph)	72	492	0	101	682	0	77	190	119	134	404	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	38.6		9.5	9.5		9.5	9.5	9.5	9.5	36.6	
Total Split (s)	14.1	38.6		13.3	37.8		11.5	28.5	28.5	19.6	36.6	
Total Split (%)	14.1%	38.6%		13.3%	37.8%		11.5%	28.5%	28.5%	19.6%	36.6%	
Maximum Green (s)	9.6	34.1		8.8	33.3		7.0	24.0	24.0	15.1	32.1	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	Max	None	Max	
Walk Time (s)		7.0									7.0	
Flash Dont Walk (s)		27.1									25.1	
Pedestrian Calls (#/hr)		0									0	
Act Effct Green (s)	8.3	22.6		8.5	22.5		7.0	26.6	26.6	11.5	34.2	
Actuated g/C Ratio	0.10	0.27		0.10	0.27		0.08	0.31	0.31	0.14	0.40	
v/c Ratio	0.42	0.52		0.57	0.72		0.53	0.32	0.19	0.56	0.55	
Control Delay	47.5	27.8		54.4	31.7		56.1	28.2	2.7	46.4	26.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	47.5	27.8		54.4	31.7		56.1	28.2	2.7	46.4	26.2	
LOS	D	C		D	C		E	C	A	D	C	
Approach Delay		30.3			34.6			25.9			31.2	
Approach LOS		C			C			C			C	

Intersection Summary	
Area Type: Other	
Cycle Length: 100	
Actuated Cycle Length: 84.6	
Natural Cycle: 95	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 31.3	Intersection LOS: C
Intersection Capacity Utilization 64.5%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 3: Menifee Rd & Scott Rd



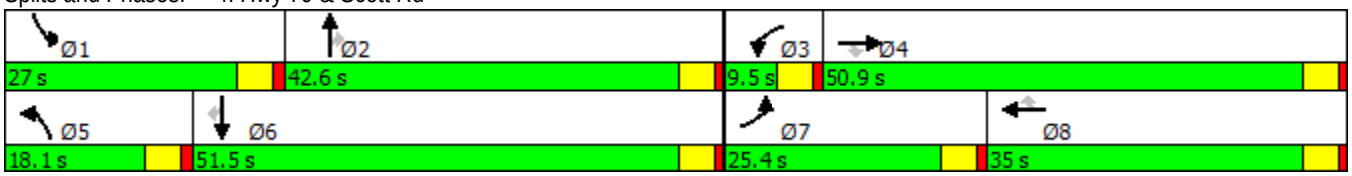
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	152	93	94	1	71	171	88	612	1	240	1075	151
Future Volume (vph)	152	93	94	1	71	171	88	612	1	240	1075	151
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	5085	1583	1770	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	5085	1583	1770	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			126			186			164			164
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1266			804			669			738	
Travel Time (s)		28.8			18.3			15.2			16.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	165	101	102	1	77	186	96	665	1	261	1168	164
Shared Lane Traffic (%)												
Lane Group Flow (vph)	165	101	102	1	77	186	96	665	1	261	1168	164
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	9.5	50.9	50.9	9.5	9.5	9.5	9.5	41.9	41.9	9.5	49.8	49.8
Total Split (s)	25.4	50.9	50.9	9.5	35.0	35.0	18.1	42.6	42.6	27.0	51.5	51.5
Total Split (%)	19.5%	39.2%	39.2%	7.3%	26.9%	26.9%	13.9%	32.8%	32.8%	20.8%	39.6%	39.6%
Maximum Green (s)	20.9	46.4	46.4	5.0	30.5	30.5	13.6	38.1	38.1	22.5	47.0	47.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)		7.0	7.0					7.0	7.0		7.0	7.0
Flash Dont Walk (s)		39.4	39.4					30.4	30.4		38.3	38.3
Pedestrian Calls (#/hr)		0	0					0	0		0	0
Act Effct Green (s)	14.7	27.2	27.2	5.0	9.6	9.6	10.5	38.8	38.8	19.8	48.1	48.1
Actuated g/C Ratio	0.15	0.27	0.27	0.05	0.09	0.09	0.10	0.38	0.38	0.20	0.48	0.48
v/c Ratio	0.64	0.20	0.20	0.01	0.44	0.58	0.52	0.34	0.00	0.75	0.48	0.20
Control Delay	53.4	30.7	4.4	51.0	52.7	14.7	55.0	24.1	0.0	53.8	20.1	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.4	30.7	4.4	51.0	52.7	14.7	55.0	24.1	0.0	53.8	20.1	3.7
LOS	D	C	A	D	D	B	D	C	A	D	C	A
Approach Delay		33.6			25.9			28.0			24.0	
Approach LOS		C			C			C			C	

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 101.1
Natural Cycle: 120
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.75
Intersection Signal Delay: 26.3 — Intersection LOS: C
Intersection Capacity Utilization 52.0% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 4: Hwy 79 & Scott Rd

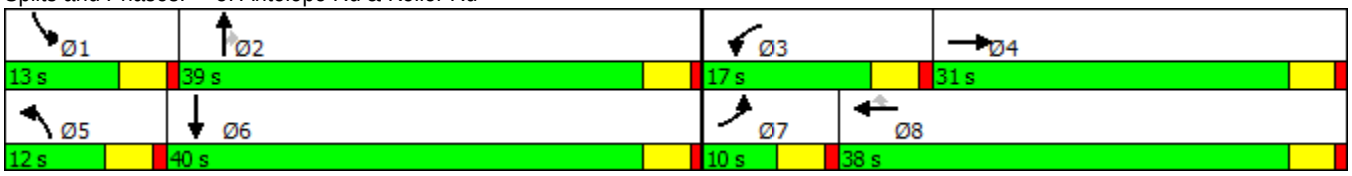


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	95	47	67	131	48	21	98	41	39	276	13
Future Volume (vph)	5	95	47	67	131	48	21	98	41	39	276	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	120		0	195		0	110		110	120		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.950				0.850			0.850		0.993	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1770	0	1770	1863	1583	1770	1863	1583	1770	1850	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1770	0	1770	1863	1583	1770	1863	1583	1770	1850	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24				115			164		3	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1361			1774			5440			744	
Travel Time (s)		30.9			40.3			123.6			16.9	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	5	101	50	71	139	51	22	104	44	41	294	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	151	0	71	139	51	22	104	44	41	308	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	29.2		9.5	26.9	26.9	9.5	30.9	30.9	9.5	29.2	
Total Split (s)	10.0	31.0		17.0	38.0	38.0	12.0	39.0	39.0	13.0	40.0	
Total Split (%)	10.0%	31.0%		17.0%	38.0%	38.0%	12.0%	39.0%	39.0%	13.0%	40.0%	
Maximum Green (s)	5.5	26.5		12.5	33.5	33.5	7.5	34.5	34.5	8.5	35.5	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		17.7			15.4	15.4		19.4	19.4		17.7	
Pedestrian Calls (#/hr)		0			0	0		0	0		0	
Act Effct Green (s)	5.6	11.0		8.5	19.9	19.9	6.5	38.0	38.0	7.1	40.6	
Actuated g/C Ratio	0.07	0.15		0.11	0.26	0.26	0.09	0.50	0.50	0.09	0.54	
v/c Ratio	0.04	0.54		0.36	0.28	0.10	0.14	0.11	0.05	0.25	0.31	
Control Delay	38.8	34.2		39.0	24.3	0.4	38.7	15.4	0.1	39.3	14.5	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	38.8	34.2		39.0	24.3	0.4	38.7	15.4	0.1	39.3	14.5	
LOS	D	C		D	C	A	D	B	A	D	B	
Approach Delay		34.4			23.6			14.5			17.4	
Approach LOS		C			C			B			B	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 75.5	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.54	
Intersection Signal Delay: 21.4	Intersection LOS: C
Intersection Capacity Utilization 40.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 5: Antelope Rd & Keller Rd



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	23	79	81	65	174	231
Future Volume (vph)	23	79	81	65	174	231
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		20	150	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	1583	1863	1583	1770	1863
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		92		76		
Link Speed (mph)	30		30			30
Link Distance (ft)	2823		806			5440
Travel Time (s)	64.2		18.3			123.6
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	27	92	94	76	202	269
Shared Lane Traffic (%)						
Lane Group Flow (vph)	27	92	94	76	202	269
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	24		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (ft)	20	20	100	20	20	100
Trailing Detector (ft)	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0
Detector 1 Size(ft)	20	20	6	20	20	6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)			94			94
Detector 2 Size(ft)			6			6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	34.9	34.9	9.5	22.5
Total Split (s)	26.0	26.0	40.0	40.0	34.0	74.0
Total Split (%)	26.0%	26.0%	40.0%	40.0%	34.0%	74.0%
Maximum Green (s)	21.5	21.5	35.5	35.5	29.5	69.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max
Walk Time (s)			7.0	7.0		
Flash Dont Walk (s)			23.4	23.4		
Pedestrian Calls (#/hr)			0	0		
Act Effct Green (s)	7.0	7.0	50.6	50.6	14.6	70.8
Actuated g/C Ratio	0.08	0.08	0.61	0.61	0.17	0.85
v/c Ratio	0.18	0.42	0.08	0.08	0.65	0.17
Control Delay	39.2	15.1	9.4	3.0	42.4	2.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.2	15.1	9.4	3.0	42.4	2.0
LOS	D	B	A	A	D	A
Approach Delay	20.5		6.5			19.4
Approach LOS	C		A			B

Intersection Summary	
Area Type: Other	
Cycle Length: 100	
Actuated Cycle Length: 83.6	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 16.7	Intersection LOS: B
Intersection Capacity Utilization 28.0%	ICU Level of Service A
Analysis Period (min) 15	

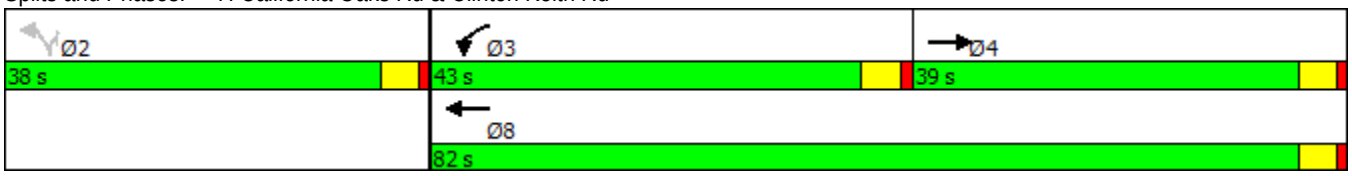
Splits and Phases: 6: Antelope Rd & Baxter Rd

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	900	134	571	855	131	431
Future Volume (vph)	900	134	571	855	131	431
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	225		100	0
Storage Lanes		0	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.95	0.95	1.00	0.95	0.97	0.91
Frt	0.981				0.907	0.850
Flt Protected			0.950		0.981	
Satd. Flow (prot)	3472	0	1770	3539	3215	1441
Flt Permitted			0.950		0.981	
Satd. Flow (perm)	3472	0	1770	3539	3215	1441
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	14				227	227
Link Speed (mph)	30			30	30	
Link Distance (ft)	2233			3569	625	
Travel Time (s)	50.8			81.1	14.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	947	141	601	900	138	454
Shared Lane Traffic (%)						50%
Lane Group Flow (vph)	1088	0	601	900	365	227
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	24	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Number of Detectors	2		1	2	1	1
Detector Template	Thru		Left	Thru	Left	Right
Leading Detector (ft)	100		20	100	20	20
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	6		20	6	20	20
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Prot	NA	Perm	Perm
Protected Phases	4		3	8		
Permitted Phases					2	2

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	4		3	8	2	2
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0
Minimum Split (s)	36.6		9.5	9.5	37.2	37.2
Total Split (s)	39.0		43.0	82.0	38.0	38.0
Total Split (%)	32.5%		35.8%	68.3%	31.7%	31.7%
Maximum Green (s)	34.5		38.5	77.5	33.5	33.5
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5		4.5	4.5	4.5	4.5
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	None	Max	Max
Walk Time (s)	7.0				7.0	7.0
Flash Dont Walk (s)	25.1				25.7	25.7
Pedestrian Calls (#/hr)	0				0	0
Act Effct Green (s)	34.5		38.5	77.5	33.5	33.5
Actuated g/C Ratio	0.29		0.32	0.65	0.28	0.28
v/c Ratio	1.08		1.06	0.39	0.34	0.40
Control Delay	92.6		94.4	10.7	13.5	6.5
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	92.6		94.4	10.7	13.5	6.5
LOS	F		F	B	B	A
Approach Delay	92.6			44.2	10.8	
Approach LOS	F			D	B	

Intersection Summary	
Area Type: Other	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 135	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.08	
Intersection Signal Delay: 54.6	Intersection LOS: D
Intersection Capacity Utilization 80.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 7: California Oaks Rd & Clinton Keith Rd

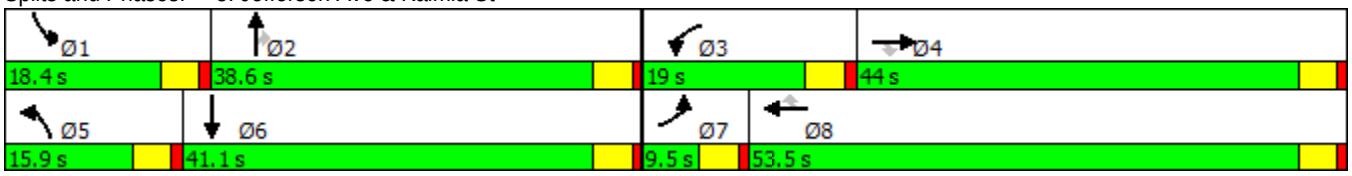


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	688	257	201	571	186	139	122	106	192	275	46
Future Volume (vph)	26	688	257	201	571	186	139	122	106	192	275	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		140	235		0	205		0	145		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Frt			0.850			0.850			0.850		0.978	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	1863	1583	1770	1863	1583	1770	3461	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3539	1583	1770	1863	1583	1770	1863	1583	1770	3461	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			209			181			136		16	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1399			684			2782			1004	
Travel Time (s)		31.8			15.5			63.2			22.8	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	29	756	282	221	627	204	153	134	116	211	302	51
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	756	282	221	627	204	153	134	116	211	353	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	44.0	44.0	9.5	34.9	34.9	9.5	38.6	38.6	9.5	39.5	
Total Split (s)	9.5	44.0	44.0	19.0	53.5	53.5	15.9	38.6	38.6	18.4	41.1	
Total Split (%)	7.9%	36.7%	36.7%	15.8%	44.6%	44.6%	13.3%	32.2%	32.2%	15.3%	34.3%	
Maximum Green (s)	5.0	39.5	39.5	14.5	49.0	49.0	11.4	34.1	34.1	13.9	36.6	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		32.5	32.5		23.4	23.4		27.1	27.1		28.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	
Act Effct Green (s)	5.0	33.4	33.4	14.5	47.0	47.0	11.4	34.2	34.2	13.9	36.7	
Actuated g/C Ratio	0.04	0.29	0.29	0.13	0.41	0.41	0.10	0.30	0.30	0.12	0.32	
v/c Ratio	0.38	0.73	0.46	0.98	0.82	0.27	0.86	0.24	0.20	0.98	0.31	
Control Delay	69.4	40.6	11.3	107.1	40.6	5.6	92.0	33.1	4.5	107.4	29.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	69.4	40.6	11.3	107.1	40.6	5.6	92.0	33.1	4.5	107.4	29.8	
LOS	E	D	B	F	D	A	F	C	A	F	C	
Approach Delay		33.7			47.8			47.2			58.8	
Approach LOS		C			D			D			E	

Intersection Summary	
Area Type: Other	
Cycle Length: 120	
Actuated Cycle Length: 114.2	
Natural Cycle: 115	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.98	
Intersection Signal Delay: 44.8	Intersection LOS: D
Intersection Capacity Utilization 66.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 8: Jefferson Ave & Kalmia St

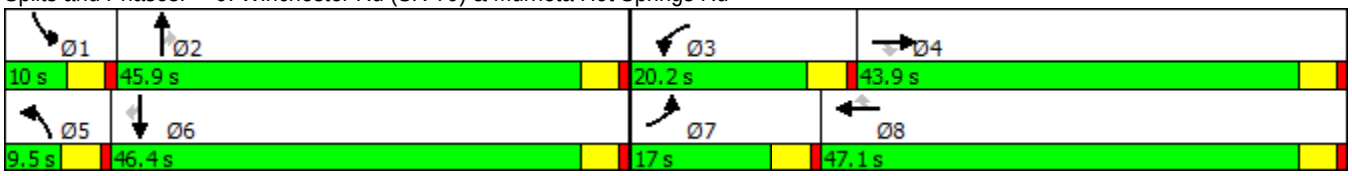


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	477	497	112	268	521	94	120	677	133	172	1507	541
Future Volume (vph)	477	497	112	268	521	94	120	677	133	172	1507	541
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	195		200	195		200	205		0	210		0
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	3433	3539	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	3539	1583	3433	5085	1583	3433	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			108			97			137			344
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1422			1339			680			585	
Travel Time (s)		32.3			30.4			15.5			13.3	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	492	512	115	276	537	97	124	698	137	177	1554	558
Shared Lane Traffic (%)												
Lane Group Flow (vph)	492	512	115	276	537	97	124	698	137	177	1554	558
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	9.5	9.5	9.5	47.1	47.1	9.5	44.4	44.4	9.5	44.9	44.9
Total Split (s)	17.0	43.9	43.9	20.2	47.1	47.1	9.5	45.9	45.9	10.0	46.4	46.4
Total Split (%)	14.2%	36.6%	36.6%	16.8%	39.3%	39.3%	7.9%	38.3%	38.3%	8.3%	38.7%	38.7%
Maximum Green (s)	12.5	39.4	39.4	15.7	42.6	42.6	5.0	41.4	41.4	5.5	41.9	41.9
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)					7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)					35.6	35.6		32.9	32.9		33.4	33.4
Pedestrian Calls (#/hr)					0	0		0	0		0	0
Act Effct Green (s)	12.5	21.1	21.1	12.8	21.3	21.3	5.0	41.5	41.5	5.5	42.0	42.0
Actuated g/C Ratio	0.13	0.21	0.21	0.13	0.22	0.22	0.05	0.42	0.42	0.06	0.42	0.42
v/c Ratio	1.13	0.47	0.27	0.62	0.70	0.23	0.72	0.33	0.18	0.93	0.72	0.64
Control Delay	125.3	35.8	9.3	47.6	41.1	7.9	70.4	20.4	4.2	97.4	26.5	12.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	125.3	35.8	9.3	47.6	41.1	7.9	70.4	20.4	4.2	97.4	26.5	12.4
LOS	F	D	A	D	D	A	E	C	A	F	C	B
Approach Delay		72.4			39.5			24.6			28.6	
Approach LOS		E			D			C			C	

Intersection Summary	
Area Type: Other	
Cycle Length: 120	
Actuated Cycle Length: 98.9	
Natural Cycle: 125	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.13	
Intersection Signal Delay: 39.0	Intersection LOS: D
Intersection Capacity Utilization 76.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 9: Winchester Rd (SR-79) & Murrieta Hot Springs Rd

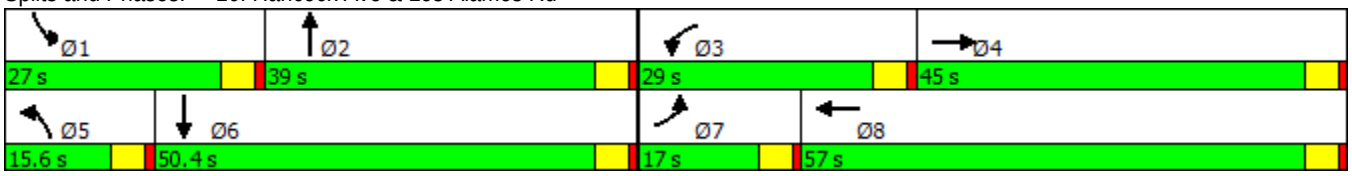


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	117	746	74	238	939	195	86	103	88	461	216	188
Future Volume (vph)	117	746	74	238	939	195	86	103	88	461	216	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	100		0	100		0	225		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	0.97	1.00	1.00
Frt		0.987			0.974			0.931			0.930	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3493	0	1770	3447	0	1770	3295	0	3433	1732	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3493	0	1770	3447	0	1770	3295	0	3433	1732	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			20			96			33	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		440			1059			599			686	
Travel Time (s)		10.0			24.1			13.6			15.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	127	811	80	259	1021	212	93	112	96	501	235	204
Shared Lane Traffic (%)												
Lane Group Flow (vph)	127	891	0	259	1233	0	93	208	0	501	439	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	36.4		9.5	36.4		9.5	36.9		9.5	36.4	
Total Split (s)	17.0	45.0		29.0	57.0		15.6	39.0		27.0	50.4	
Total Split (%)	12.1%	32.1%		20.7%	40.7%		11.1%	27.9%		19.3%	36.0%	
Maximum Green (s)	12.5	40.5		24.5	52.5		11.1	34.5		22.5	45.9	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Max		None	Max	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		24.9			24.9			25.4			24.9	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	12.1	40.9		23.0	51.7		10.4	34.5		22.1	46.1	
Actuated g/C Ratio	0.09	0.30		0.17	0.37		0.08	0.25		0.16	0.33	
v/c Ratio	0.82	0.86		0.88	0.95		0.70	0.23		0.92	0.73	
Control Delay	99.3	55.7		86.2	56.8		89.2	23.0		79.9	46.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	99.3	55.7		86.2	56.8		89.2	23.0		79.9	46.4	
LOS	F	E		F	E		F	C		E	D	
Approach Delay		61.1			61.9			43.4			64.3	
Approach LOS		E			E			D			E	

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 138.4	
Natural Cycle: 115	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.95	
Intersection Signal Delay: 60.8	Intersection LOS: E
Intersection Capacity Utilization 81.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 10: Hancock Ave & Los Alamos Rd

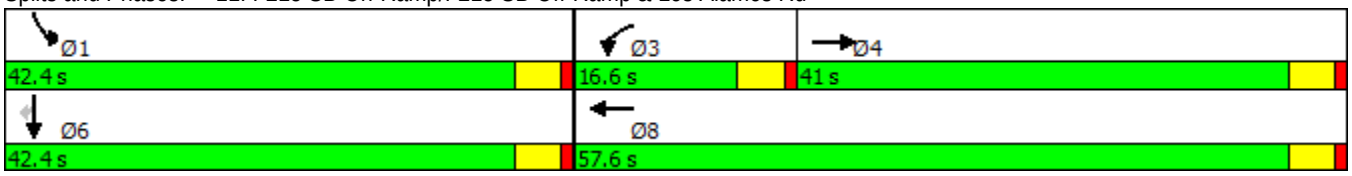


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	967	359	223	917	0	0	0	0	146	3	733
Future Volume (vph)	0	967	359	223	917	0	0	0	0	146	3	733
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		95	100		0	0		0	305		305
Storage Lanes	0		1	2		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	0.97	0.95	1.00	1.00	1.00	1.00	0.95	0.91	0.95
Frt		0.959									0.857	0.850
Flt Protected				0.950						0.950	0.998	
Satd. Flow (prot)	0	4877	0	3433	3539	0	0	0	0	1681	1450	1504
Flt Permitted				0.950						0.950	0.998	
Satd. Flow (perm)	0	4877	0	3433	3539	0	0	0	0	1681	1450	1504
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		105									103	103
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1059			394			642			451	
Travel Time (s)		24.1			9.0			14.6			10.3	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	997	370	230	945	0	0	0	0	151	3	756
Shared Lane Traffic (%)										10%		49%
Lane Group Flow (vph)	0	1367	0	230	945	0	0	0	0	136	388	386
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2		1	2					1	2	1
Detector Template		Thru		Left	Thru					Left	Thru	Right
Leading Detector (ft)		100		20	100					20	100	20
Trailing Detector (ft)		0		0	0					0	0	0
Detector 1 Position(ft)		0		0	0					0	0	0
Detector 1 Size(ft)		6		20	6					20	6	20
Detector 1 Type		Cl+Ex		Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0		0.0	0.0					0.0	0.0	0.0
Detector 1 Queue (s)		0.0		0.0	0.0					0.0	0.0	0.0
Detector 1 Delay (s)		0.0		0.0	0.0					0.0	0.0	0.0
Detector 2 Position(ft)		94			94						94	
Detector 2 Size(ft)		6			6						6	
Detector 2 Type		Cl+Ex			Cl+Ex						Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0						0.0	
Turn Type		NA		Prot	NA					Prot	NA	Perm
Protected Phases		4		3	8					1	6	
Permitted Phases												6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		4		3	8					1	6	6
Switch Phase												
Minimum Initial (s)		5.0		5.0	5.0					5.0	5.0	5.0
Minimum Split (s)		34.6		9.5	28.4					9.5	9.5	9.5
Total Split (s)		41.0		16.6	57.6					42.4	42.4	42.4
Total Split (%)		41.0%		16.6%	57.6%					42.4%	42.4%	42.4%
Maximum Green (s)		36.5		12.1	53.1					37.9	37.9	37.9
Yellow Time (s)		3.5		3.5	3.5					3.5	3.5	3.5
All-Red Time (s)		1.0		1.0	1.0					1.0	1.0	1.0
Lost Time Adjust (s)		0.0		0.0	0.0					0.0	0.0	0.0
Total Lost Time (s)		4.5		4.5	4.5					4.5	4.5	4.5
Lead/Lag		Lag		Lead								
Lead-Lag Optimize?		Yes		Yes								
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	3.0
Recall Mode		None		None	None					None	Max	Max
Walk Time (s)		7.0			7.0							
Flash Dont Walk (s)		23.1			16.9							
Pedestrian Calls (#/hr)		0			0							
Act Effct Green (s)		33.8		10.9	49.2					31.1	29.5	38.0
Actuated g/C Ratio		0.35		0.11	0.51					0.32	0.31	0.39
v/c Ratio		0.77		0.59	0.52					0.25	0.75	0.59
Control Delay		28.8		47.9	16.7					23.2	30.7	21.6
Queue Delay		0.0		0.0	0.0					0.0	0.0	0.0
Total Delay		28.8		47.9	16.7					23.2	30.7	21.6
LOS		C		D	B					C	C	C
Approach Delay		28.8			22.8						25.7	
Approach LOS		C			C						C	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 96.3	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 26.0	Intersection LOS: C
Intersection Capacity Utilization 63.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 11: I-215 SB On-Ramp/I-215 SB Off-Ramp & Los Alamos Rd

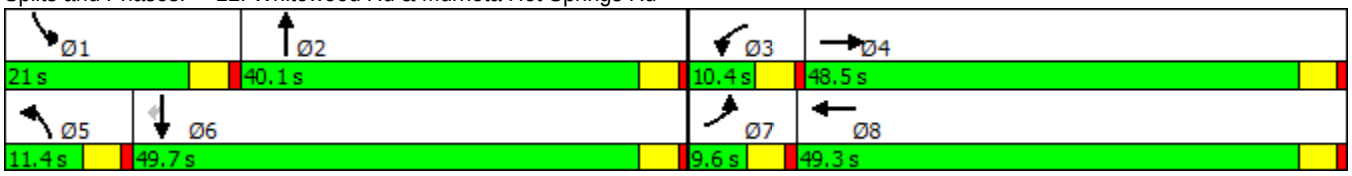


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	1248	10	23	1584	247	35	62	45	421	48	141
Future Volume (vph)	28	1248	10	23	1584	247	35	62	45	421	48	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	215		0	150		0	150		0	225		0
Storage Lanes	1		0	1		0	1		0	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	0.97	1.00	1.00
Frt		0.999			0.980			0.937				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	5080	0	1770	4984	0	1770	1745	0	3433	1863	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	5080	0	1770	4984	0	1770	1745	0	3433	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			28			31				150
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		764			996			580			564	
Travel Time (s)		17.4			22.6			13.2			12.8	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	30	1328	11	24	1685	263	37	66	48	448	51	150
Shared Lane Traffic (%)												
Lane Group Flow (vph)	30	1339	0	24	1948	0	37	114	0	448	51	150
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	26.6		9.5	32.6		9.5	38.6		9.5	38.9	38.9
Total Split (s)	9.6	48.5		10.4	49.3		11.4	40.1		21.0	49.7	49.7
Total Split (%)	8.0%	40.4%		8.7%	41.1%		9.5%	33.4%		17.5%	41.4%	41.4%
Maximum Green (s)	5.1	44.0		5.9	44.8		6.9	35.6		16.5	45.2	45.2
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		15.1			21.1			27.1			27.4	27.4
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	5.1	44.4		5.8	44.9		6.6	35.7		16.5	50.1	50.1
Actuated g/C Ratio	0.04	0.38		0.05	0.39		0.06	0.31		0.14	0.43	0.43
v/c Ratio	0.39	0.69		0.27	1.00		0.37	0.20		0.92	0.06	0.20
Control Delay	70.1	32.9		62.6	56.8		64.9	23.5		74.6	23.2	4.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	70.1	32.9		62.6	56.8		64.9	23.5		74.6	23.2	4.6
LOS	E	C		E	E		E	C		E	C	A
Approach Delay		33.7			56.8			33.7			54.4	
Approach LOS		C			E			C			D	

Intersection Summary	
Area Type: Other	
Cycle Length: 120	
Actuated Cycle Length: 116.2	
Natural Cycle: 115	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.00	
Intersection Signal Delay: 48.0	Intersection LOS: D
Intersection Capacity Utilization 62.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 12: Whitewood Rd & Murrieta Hot Springs Rd

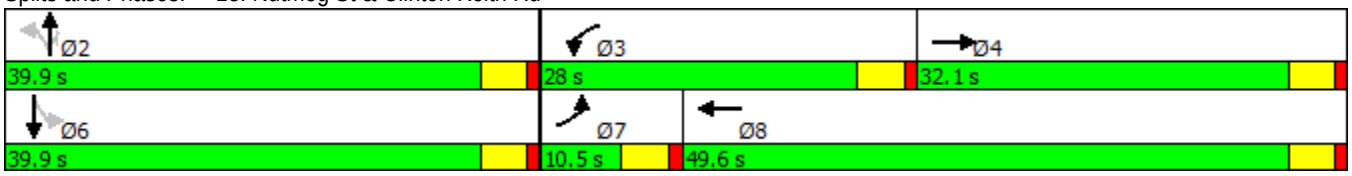


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	581	96	309	617	92	105	42	325	118	61	28
Future Volume (vph)	28	581	96	309	617	92	105	42	325	118	61	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	225		0	180		0	50		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.979			0.981				0.850		0.953	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3465	0	1770	3472	0	1770	1863	1583	1770	1775	0
Flt Permitted	0.950			0.950			0.695			0.728		
Satd. Flow (perm)	1770	3465	0	1770	3472	0	1295	1863	1583	1356	1775	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			21				346		26	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		471			2233			1168			1110	
Travel Time (s)		10.7			50.8			26.5			25.2	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	30	618	102	329	656	98	112	45	346	126	65	30
Shared Lane Traffic (%)												
Lane Group Flow (vph)	30	720	0	329	754	0	112	45	346	126	95	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2		2	6		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	32.1		9.5	9.5		38.6	38.6	38.6	9.5	9.5	
Total Split (s)	10.5	32.1		28.0	49.6		39.9	39.9	39.9	39.9	39.9	
Total Split (%)	10.5%	32.1%		28.0%	49.6%		39.9%	39.9%	39.9%	39.9%	39.9%	
Maximum Green (s)	6.0	27.6		23.5	45.1		35.4	35.4	35.4	35.4	35.4	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	
Walk Time (s)		7.0					7.0	7.0	7.0			
Flash Dont Walk (s)		20.6					27.1	27.1	27.1			
Pedestrian Calls (#/hr)		0					0	0	0			
Act Effct Green (s)	5.9	24.4		20.9	43.8		35.6	35.6	35.6	35.6	35.6	
Actuated g/C Ratio	0.06	0.26		0.22	0.46		0.38	0.38	0.38	0.38	0.38	
v/c Ratio	0.27	0.79		0.84	0.47		0.23	0.06	0.43	0.25	0.14	
Control Delay	51.1	39.3		55.8	18.4		23.6	21.4	4.4	23.7	16.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	51.1	39.3		55.8	18.4		23.6	21.4	4.4	23.7	16.8	
LOS	D	D		E	B		C	C	A	C	B	
Approach Delay		39.8			29.8			10.2			20.7	
Approach LOS		D			C			B			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 94.5	
Natural Cycle: 85	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 28.1	Intersection LOS: C
Intersection Capacity Utilization 60.7%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 13: Nutmeg St & Clinton Keith Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	260	184	43	284	14	200	54	23	23	91	10
Future Volume (vph)	17	260	184	43	284	14	200	54	23	23	91	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.946			0.994			0.989			0.989	
Flt Protected		0.998			0.994			0.965			0.991	
Satd. Flow (prot)	0	1759	0	0	1840	0	0	1778	0	0	1826	0
Flt Permitted		0.998			0.994			0.965			0.991	
Satd. Flow (perm)	0	1759	0	0	1840	0	0	1778	0	0	1826	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		966			752			675			676	
Travel Time (s)		22.0			17.1			15.3			15.4	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	18	277	196	46	302	15	213	57	24	24	97	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	491	0	0	363	0	0	294	0	0	132	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Stop			Stop	

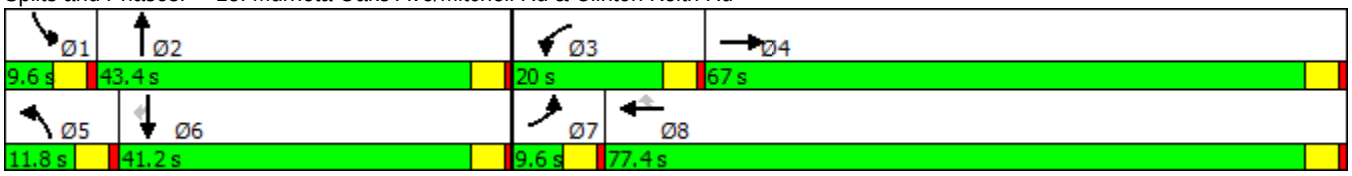
Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 62.9%	ICU Level of Service B
Analysis Period (min) 15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	1259	191	160	1266	13	52	7	174	9	33	27
Future Volume (vph)	10	1259	191	160	1266	13	52	7	174	9	33	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		210	0		0	200		200
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.91	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt		0.980				0.850		0.856				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3468	0	1770	5085	1583	1770	1595	0	3433	1863	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3468	0	1770	5085	1583	1770	1595	0	3433	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16				82		181				117
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1884			2845			958			1018	
Travel Time (s)		42.8			64.7			21.8			23.1	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	10	1311	199	167	1319	14	54	7	181	9	34	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	10	1510	0	167	1319	14	54	188	0	9	34	28
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	26.1		9.5	35.5	35.5	9.5	41.5		9.5	38.4	38.4
Total Split (s)	9.6	67.0		20.0	77.4	77.4	11.8	43.4		9.6	41.2	41.2
Total Split (%)	6.9%	47.9%		14.3%	55.3%	55.3%	8.4%	31.0%		6.9%	29.4%	29.4%
Maximum Green (s)	5.1	62.5		15.5	72.9	72.9	7.3	38.9		5.1	36.7	36.7
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	Max		None	Max	Max
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		14.6			24.0	24.0		30.0			26.9	26.9
Pedestrian Calls (#/hr)		0			0	0		0			0	0
Act Effct Green (s)	5.1	61.8		15.0	79.4	79.4	7.1	44.6		5.1	37.3	37.3
Actuated g/C Ratio	0.04	0.45		0.11	0.58	0.58	0.05	0.33		0.04	0.27	0.27
v/c Ratio	0.15	0.96		0.87	0.45	0.01	0.59	0.29		0.07	0.07	0.05
Control Delay	70.7	51.2		97.8	17.5	0.0	90.5	6.9		66.4	39.5	0.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	70.7	51.2		97.8	17.5	0.0	90.5	6.9		66.4	39.5	0.2
LOS	E	D		F	B	A	F	A		E	D	A
Approach Delay		51.3			26.2			25.5			27.4	
Approach LOS		D			C			C			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 136.8	
Natural Cycle: 130	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 37.6	Intersection LOS: D
Intersection Capacity Utilization 72.1%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 15: Murrieta Oaks Ave/Mitchell Rd & Clinton Keith Rd

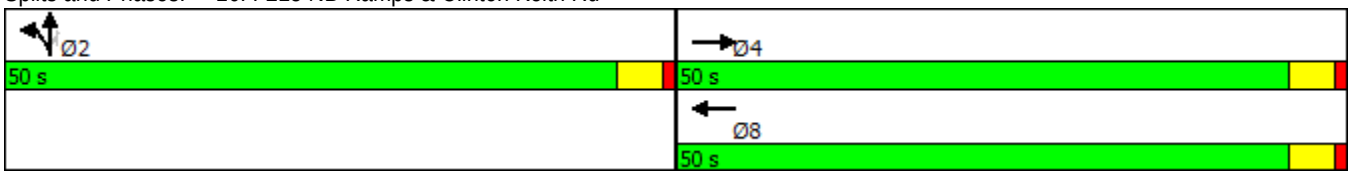


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	782	688	0	1318	267	166	0	524	0	0	0
Future Volume (vph)	0	782	688	0	1318	267	166	0	524	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		160	0		0	0		0	0		0
Storage Lanes	0		1	0		1	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Frt			0.850			0.850		0.920	0.850			
Flt Protected								0.977				
Satd. Flow (prot)	0	5085	1583	0	5085	1583	0	1591	1504	0	0	0
Flt Permitted								0.977				
Satd. Flow (perm)	0	5085	1583	0	5085	1583	0	1591	1504	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			640			219		69	69			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2845			3447			1631			722	
Travel Time (s)		64.7			78.3			37.1			16.4	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	0	942	829	0	1588	322	200	0	631	0	0	0
Shared Lane Traffic (%)									36%			
Lane Group Flow (vph)	0	942	829	0	1588	322	0	427	404	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2	1		2	1	1	2	1			
Detector Template		Thru	Right		Thru	Right	Left	Thru	Right			
Leading Detector (ft)		100	20		100	20	20	100	20			
Trailing Detector (ft)		0	0		0	0	0	0	0			
Detector 1 Position(ft)		0	0		0	0	0	0	0			
Detector 1 Size(ft)		6	20		6	20	20	6	20			
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0			
Detector 1 Queue (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0			
Detector 1 Delay (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0			
Detector 2 Position(ft)		94			94			94				
Detector 2 Size(ft)		6			6			6				
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				
Turn Type		NA	Free		NA	Free	Split	NA	Perm			
Protected Phases		4			8		2	2				
Permitted Phases			Free			Free			2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		4			8		2	2	2			
Switch Phase												
Minimum Initial (s)		5.0			5.0		5.0	5.0	5.0			
Minimum Split (s)		43.5			9.5		9.5	9.5	9.5			
Total Split (s)		50.0			50.0		50.0	50.0	50.0			
Total Split (%)		50.0%			50.0%		50.0%	50.0%	50.0%			
Maximum Green (s)		45.5			45.5		45.5	45.5	45.5			
Yellow Time (s)		3.5			3.5		3.5	3.5	3.5			
All-Red Time (s)		1.0			1.0		1.0	1.0	1.0			
Lost Time Adjust (s)		0.0			0.0			0.0	0.0			
Total Lost Time (s)		4.5			4.5			4.5	4.5			
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0			
Recall Mode		None			None		Max	Max	Max			
Walk Time (s)		7.0										
Flash Dont Walk (s)		32.0										
Pedestrian Calls (#/hr)		0										
Act Effct Green (s)		41.5	96.2		41.5	96.2		45.6	45.6			
Actuated g/C Ratio		0.43	1.00		0.43	1.00		0.47	0.47			
v/c Ratio		0.43	0.52		0.72	0.20		0.54	0.54			
Control Delay		19.6	1.2		24.6	0.3		18.6	18.6			
Queue Delay		0.0	0.0		0.0	0.0		0.0	0.0			
Total Delay		19.6	1.2		24.6	0.3		18.6	18.6			
LOS		B	A		C	A		B	B			
Approach Delay		11.0			20.5			18.6				
Approach LOS		B			C			B				

Intersection Summary	
Area Type: Other	
Cycle Length: 100	
Actuated Cycle Length: 96.2	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 16.4	Intersection LOS: B
Intersection Capacity Utilization 52.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 16: I-215 NB Ramps & Clinton Keith Rd

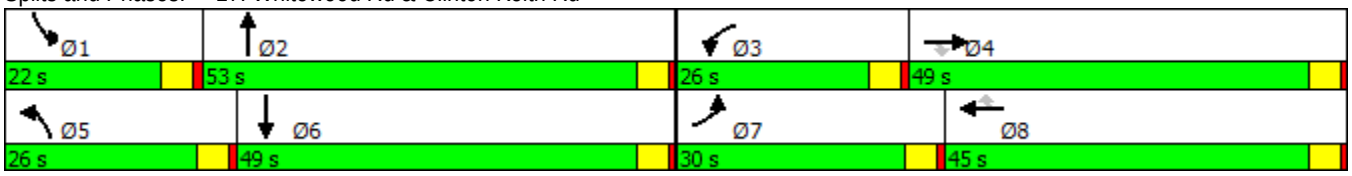


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	287	602	168	259	881	94	119	97	81	90	302	339
Future Volume (vph)	287	602	168	259	881	94	119	97	81	90	302	339
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	260		0	0		0	310		0	100		0
Storage Lanes	2		1	2		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.91	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.932			0.921	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	1583	3433	5085	1583	1770	3299	0	1770	3260	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3539	1583	3433	5085	1583	1770	3299	0	1770	3260	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			195			105		94			192	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3447			893			3330			2871	
Travel Time (s)		78.3			20.3			75.7			65.3	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	334	700	195	301	1024	109	138	113	94	105	351	394
Shared Lane Traffic (%)												
Lane Group Flow (vph)	334	700	195	301	1024	109	138	207	0	105	745	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	29.2	29.2	29.2	9.5	9.5	9.5	9.5	46.4		9.5	43.5	
Total Split (s)	30.0	49.0	49.0	26.0	45.0	45.0	26.0	53.0		22.0	49.0	
Total Split (%)	20.0%	32.7%	32.7%	17.3%	30.0%	30.0%	17.3%	35.3%		14.7%	32.7%	
Maximum Green (s)	25.5	44.5	44.5	21.5	40.5	40.5	21.5	48.5		17.5	44.5	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Max		None	Max	
Walk Time (s)	7.0	7.0	7.0					7.0			7.0	
Flash Dont Walk (s)	17.7	17.7	17.7					34.9			32.0	
Pedestrian Calls (#/hr)	0	0	0					0			0	
Act Effct Green (s)	18.5	36.9	36.9	16.9	35.4	35.4	15.6	49.0		13.0	46.4	
Actuated g/C Ratio	0.14	0.28	0.28	0.13	0.26	0.26	0.12	0.37		0.10	0.35	
v/c Ratio	0.71	0.72	0.34	0.70	0.76	0.22	0.67	0.16		0.61	0.59	
Control Delay	64.8	48.8	6.6	66.3	50.1	8.9	74.7	17.7		75.5	30.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	64.8	48.8	6.6	66.3	50.1	8.9	74.7	17.7		75.5	30.2	
LOS	E	D	A	E	D	A	E	B		E	C	
Approach Delay		46.5			50.3			40.5			35.8	
Approach LOS		D			D			D			D	

Intersection Summary	
Area Type: Other	
Cycle Length: 150	
Actuated Cycle Length: 134	
Natural Cycle: 115	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay: 45.0	Intersection LOS: D
Intersection Capacity Utilization 66.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 17: Whitewood Rd & Clinton Keith Rd

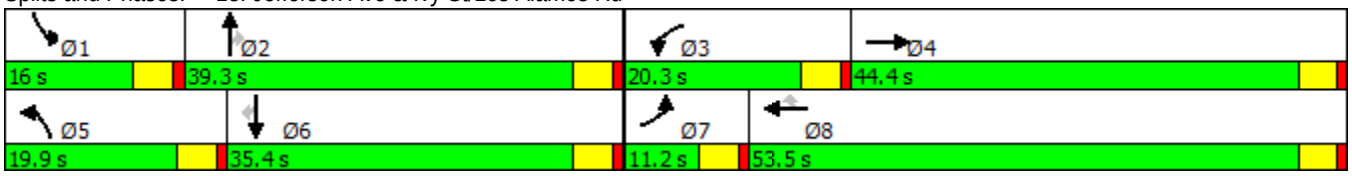


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	147	128	236	188	166	113	193	54	164	464	46
Future Volume (vph)	35	147	128	236	188	166	113	193	54	164	464	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		0	205		0	230		215	250		220
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.930				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3291	0	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3291	0	1770	1863	1583	1770	3539	1583	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		132				171			136			136
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1401			1395			2768			2782	
Travel Time (s)		31.8			31.7			62.9			63.2	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	36	152	132	243	194	171	116	199	56	169	478	47
Shared Lane Traffic (%)												
Lane Group Flow (vph)	36	284	0	243	194	171	116	199	56	169	478	47
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	44.4		9.5	44.4	44.4	9.5	38.4	38.4	9.5	34.4	34.4
Total Split (s)	11.2	44.4		20.3	53.5	53.5	19.9	39.3	39.3	16.0	35.4	35.4
Total Split (%)	9.3%	37.0%		16.9%	44.6%	44.6%	16.6%	32.8%	32.8%	13.3%	29.5%	29.5%
Maximum Green (s)	6.7	39.9		15.8	49.0	49.0	15.4	34.8	34.8	11.5	30.9	30.9
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		32.9			32.9	32.9		26.9	26.9		22.9	22.9
Pedestrian Calls (#/hr)		0			0	0		0	0		0	0
Act Effct Green (s)	6.4	9.6		15.8	23.3	23.3	11.1	34.8	34.8	11.5	35.3	35.3
Actuated g/C Ratio	0.07	0.11		0.18	0.26	0.26	0.12	0.39	0.39	0.13	0.39	0.39
v/c Ratio	0.29	0.60		0.78	0.40	0.32	0.53	0.15	0.08	0.75	0.34	0.07
Control Delay	46.4	25.7		54.8	32.0	6.6	46.0	18.7	0.2	59.8	21.0	0.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.4	25.7		54.8	32.0	6.6	46.0	18.7	0.2	59.8	21.0	0.2
LOS	D	C		D	C	A	D	B	A	E	C	A
Approach Delay		28.1			34.0			24.4			29.1	
Approach LOS		C			C			C			C	

Intersection Summary	
Area Type: Other	
Cycle Length: 120	
Actuated Cycle Length: 89.8	
Natural Cycle: 115	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 29.5	Intersection LOS: C
Intersection Capacity Utilization 55.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 18: Jefferson Ave & Ivy St/Los Alamos Rd

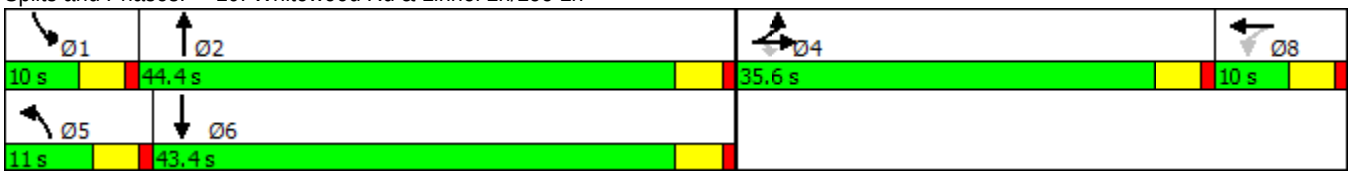


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	4	37	3	5	2	24	430	2	1	644	154
Future Volume (vph)	38	4	37	3	5	2	24	430	2	1	644	154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	135		0	0		0	205		0	205		0
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.973			0.999			0.971	
Flt Protected	0.950				0.985		0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	0	1785	0	1770	3536	0	1770	3437	0
Flt Permitted	0.950						0.950			0.950		
Satd. Flow (perm)	1770	1863	1583	0	1812	0	1770	3536	0	1770	3437	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			115		2						34	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1415			1455			2871			2884	
Travel Time (s)		32.2			33.1			65.3			65.5	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	42	4	41	3	5	2	26	473	2	1	708	169
Shared Lane Traffic (%)												
Lane Group Flow (vph)	42	4	41	0	10	0	26	475	0	1	877	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases	4	4			8		5	2		1	6	
Permitted Phases			4	8								

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	35.5	35.5	35.5	9.5	9.5		9.5	27.4		9.5	32.1	
Total Split (s)	35.6	35.6	35.6	10.0	10.0		11.0	44.4		10.0	43.4	
Total Split (%)	35.6%	35.6%	35.6%	10.0%	10.0%		11.0%	44.4%		10.0%	43.4%	
Maximum Green (s)	31.1	31.1	31.1	5.5	5.5		6.5	39.9		5.5	38.9	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5		4.5		4.5	4.5		4.5	4.5	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Max		None	Max	
Walk Time (s)	7.0	7.0	7.0					7.0			7.0	
Flash Dont Walk (s)	24.0	24.0	24.0					15.9			20.6	
Pedestrian Calls (#/hr)	0	0	0					0			0	
Act Effct Green (s)	7.1	7.1	7.1		5.5		6.2	51.5		5.5	49.1	
Actuated g/C Ratio	0.10	0.10	0.10		0.08		0.09	0.76		0.08	0.72	
v/c Ratio	0.23	0.02	0.15		0.07		0.16	0.18		0.01	0.35	
Control Delay	32.2	28.8	1.2		29.7		32.9	4.8		32.0	6.7	
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay	32.2	28.8	1.2		29.7		32.9	4.8		32.0	6.7	
LOS	C	C	A		C		C	A		C	A	
Approach Delay		17.4			29.7			6.2			6.7	
Approach LOS		B			C			A			A	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 67.9	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.35	
Intersection Signal Delay: 7.4	Intersection LOS: A
Intersection Capacity Utilization 42.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 19: Whitewood Rd & Linnel Ln/Lee Ln

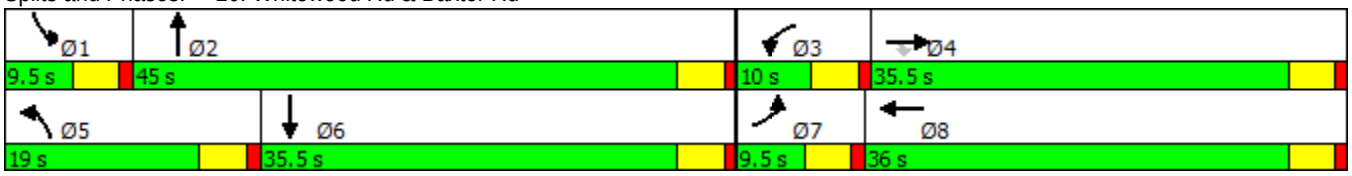


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	9	85	28	3	6	132	301	16	5	713	21
Future Volume (vph)	16	9	85	28	3	6	132	301	16	5	713	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	215		0	120		0	220		0	200		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.895			0.993			0.996	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	3168	0	1770	3514	0	1770	3525	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1863	1583	1770	3168	0	1770	3514	0	1770	3525	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			164		496			6			3	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2823			874			2884			792	
Travel Time (s)		64.2			19.9			65.5			18.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	17	10	92	30	3	7	143	327	17	5	775	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	17	10	92	30	10	0	143	344	0	5	798	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	35.5	35.5	9.5	34.9		9.5	32.1		9.5	32.1	
Total Split (s)	9.5	35.5	35.5	10.0	36.0		19.0	45.0		9.5	35.5	
Total Split (%)	9.5%	35.5%	35.5%	10.0%	36.0%		19.0%	45.0%		9.5%	35.5%	
Maximum Green (s)	5.0	31.0	31.0	5.5	31.5		14.5	40.5		5.0	31.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Max		None	Max	
Walk Time (s)		7.0	7.0		7.0			7.0			7.0	
Flash Dont Walk (s)		24.0	24.0		23.4			20.6			20.6	
Pedestrian Calls (#/hr)		0	0		0			0			0	
Act Effct Green (s)	5.1	6.0	6.0	5.6	7.9		10.7	49.1		5.1	34.5	
Actuated g/C Ratio	0.08	0.09	0.09	0.08	0.12		0.16	0.74		0.08	0.52	
v/c Ratio	0.13	0.06	0.32	0.20	0.01		0.50	0.13		0.04	0.43	
Control Delay	34.1	31.4	3.7	34.6	0.0		32.5	4.8		32.8	13.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	34.1	31.4	3.7	34.6	0.0		32.5	4.8		32.8	13.1	
LOS	C	C	A	C	A		C	A		C	B	
Approach Delay		10.4			26.0			12.9			13.2	
Approach LOS		B			C			B			B	

Intersection Summary	
Area Type: Other	
Cycle Length: 100	
Actuated Cycle Length: 66.3	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.50	
Intersection Signal Delay: 13.3	Intersection LOS: B
Intersection Capacity Utilization 47.2%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 20: Whitewood Rd & Baxter Rd



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	279	368	1070	969	258	304
Future Volume (vph)	279	368	1070	969	258	304
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	265		280	185	
Storage Lanes	2	1		1	2	
Taper Length (ft)	25				25	
Lane Util. Factor	0.97	1.00	0.91	1.00	0.97	0.95
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3433	1583	5085	1583	3433	3539
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	3433	1583	5085	1583	3433	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		233		885		
Link Speed (mph)	30		30			30
Link Distance (ft)	1412		1630			2768
Travel Time (s)	32.1		37.0			62.9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	310	409	1189	1077	287	338
Shared Lane Traffic (%)						
Lane Group Flow (vph)	310	409	1189	1077	287	338
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	48		24			24
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (ft)	20	20	100	20	20	100
Trailing Detector (ft)	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0
Detector 1 Size(ft)	20	20	6	20	20	6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)			94			94
Detector 2 Size(ft)			6			6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm	Perm	NA	Perm	Prot	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	44.4	44.4	33.8	33.8	9.5	22.5
Total Split (s)	44.4	44.4	41.6	41.6	14.0	55.6
Total Split (%)	44.4%	44.4%	41.6%	41.6%	14.0%	55.6%
Maximum Green (s)	39.9	39.9	37.1	37.1	9.5	51.1
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max
Walk Time (s)	7.0	7.0	7.0	7.0		
Flash Dont Walk (s)	32.9	32.9	22.3	22.3		
Pedestrian Calls (#/hr)	0	0	0	0		
Act Effct Green (s)	16.3	16.3	37.4	37.4	9.6	51.5
Actuated g/C Ratio	0.21	0.21	0.49	0.49	0.12	0.67
v/c Ratio	0.43	0.79	0.48	0.88	0.67	0.14
Control Delay	27.3	23.3	15.0	14.3	42.7	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.3	23.3	15.0	14.3	42.7	5.8
LOS	C	C	B	B	D	A
Approach Delay	25.0		14.7			22.8
Approach LOS	C		B			C

Intersection Summary	
Area Type: Other	
Cycle Length: 100	
Actuated Cycle Length: 76.8	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 18.1	Intersection LOS: B
Intersection Capacity Utilization 74.9%	ICU Level of Service D
Analysis Period (min) 15	

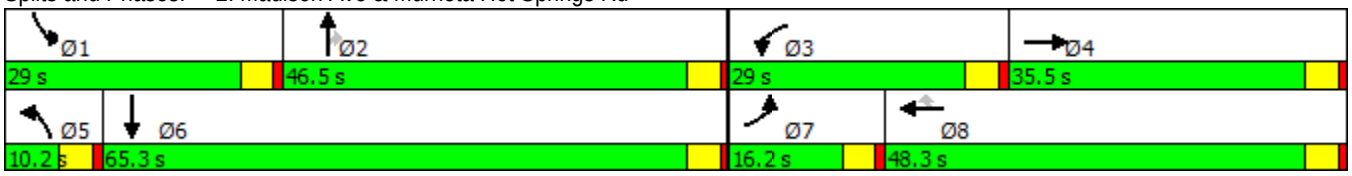
Splits and Phases: 1: Jefferson Ave & Murrieta Hot Springs Rd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	192	995	83	468	559	512	52	302	600	477	174	71
Future Volume (vph)	192	995	83	468	559	512	52	302	600	477	174	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	250		0	100		100	165		0
Storage Lanes	2		0	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.86	0.86	0.97	0.91	1.00	0.97	0.91	0.91	0.97	0.95	0.95
Frt		0.988				0.850		0.925	0.850		0.957	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	6331	0	3433	5085	1583	3433	3136	1441	3433	3387	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	6331	0	3433	5085	1583	3433	3136	1441	3433	3387	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12				444		185	312		56	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1412			2198			1707			1381	
Travel Time (s)		32.1			50.0			38.8			31.4	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	216	1118	93	526	628	575	58	339	674	536	196	80
Shared Lane Traffic (%)									50%			
Lane Group Flow (vph)	216	1211	0	526	628	575	58	676	337	536	276	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	35.5		9.5	38.4	38.4	9.5	45.2	45.2	9.5	45.2	
Total Split (s)	16.2	35.5		29.0	48.3	48.3	10.2	46.5	46.5	29.0	65.3	
Total Split (%)	11.6%	25.4%		20.7%	34.5%	34.5%	7.3%	33.2%	33.2%	20.7%	46.6%	
Maximum Green (s)	11.7	31.0		24.5	43.8	43.8	5.7	42.0	42.0	24.5	60.8	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		24.0			26.9	26.9		33.7	33.7		33.7	
Pedestrian Calls (#/hr)		0			0	0		0	0		0	
Act Effct Green (s)	11.4	30.6		23.7	42.8	42.8	5.7	42.0	42.0	23.8	62.3	
Actuated g/C Ratio	0.08	0.22		0.17	0.31	0.31	0.04	0.30	0.30	0.17	0.45	
v/c Ratio	0.77	0.86		0.89	0.40	0.72	0.41	0.62	0.51	0.91	0.18	
Control Delay	80.2	58.5		74.8	38.5	15.3	74.4	32.5	8.4	76.3	18.9	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	80.2	58.5		74.8	38.5	15.3	74.4	32.5	8.4	76.3	18.9	
LOS	F	E		E	D	B	E	C	A	E	B	
Approach Delay		61.8			41.8			27.2			56.8	
Approach LOS		E			D			C			E	

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 138.1	
Natural Cycle: 125	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 46.8	Intersection LOS: D
Intersection Capacity Utilization 72.5%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: Madison Ave & Murrieta Hot Springs Rd

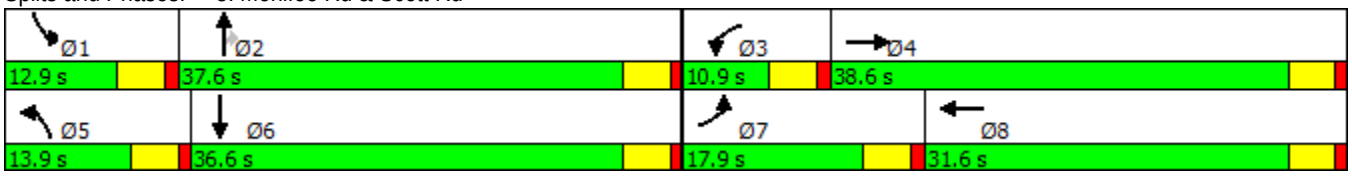


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	162	601	116	64	639	105	108	372	142	91	126	67
Future Volume (vph)	162	601	116	64	639	105	108	372	142	91	126	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	195		0	155		0	150		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.976			0.979				0.850		0.948	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3454	0	1770	3465	0	1770	1863	1583	1770	1766	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3454	0	1770	3465	0	1770	1863	1583	1770	1766	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24			18				164		28	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		804			428			403			545	
Travel Time (s)		18.3			9.7			9.2			12.4	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	167	620	120	66	659	108	111	384	146	94	130	69
Shared Lane Traffic (%)												
Lane Group Flow (vph)	167	740	0	66	767	0	111	384	146	94	199	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	38.6		9.5	9.5		9.5	9.5	9.5	9.5	36.6	
Total Split (s)	17.9	38.6		10.9	31.6		13.9	37.6	37.6	12.9	36.6	
Total Split (%)	17.9%	38.6%		10.9%	31.6%		13.9%	37.6%	37.6%	12.9%	36.6%	
Maximum Green (s)	13.4	34.1		6.4	27.1		9.4	33.1	33.1	8.4	32.1	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	Max	None	Max	
Walk Time (s)		7.0									7.0	
Flash Dont Walk (s)		27.1									25.1	
Pedestrian Calls (#/hr)		0									0	
Act Effct Green (s)	12.3	33.5		6.3	25.2		8.9	35.6	35.6	8.0	32.2	
Actuated g/C Ratio	0.13	0.35		0.07	0.26		0.09	0.37	0.37	0.08	0.33	
v/c Ratio	0.74	0.61		0.57	0.84		0.68	0.56	0.21	0.64	0.33	
Control Delay	61.8	28.4		65.6	42.6		65.1	30.3	3.8	64.7	23.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	61.8	28.4		65.6	42.6		65.1	30.3	3.8	64.7	23.4	
LOS	E	C		E	D		E	C	A	E	C	
Approach Delay		34.6			44.4			30.3			36.6	
Approach LOS		C			D			C			D	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 96.7	
Natural Cycle: 95	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 36.8	Intersection LOS: D
Intersection Capacity Utilization 69.6%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 3: Menifee Rd & Scott Rd



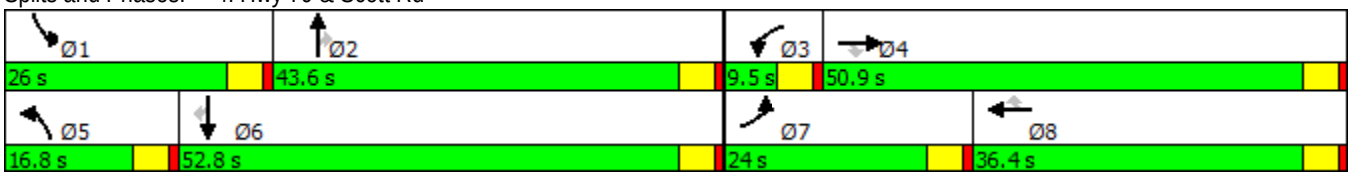
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	184	67	47	1	129	439	72	1147	1	205	839	105
Future Volume (vph)	184	67	47	1	129	439	72	1147	1	205	839	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	5085	1583	1770	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	5085	1583	1770	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			126			302			164			126
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1266			804			669			738	
Travel Time (s)		28.8			18.3			15.2			16.8	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	202	74	52	1	142	482	79	1260	1	225	922	115
Shared Lane Traffic (%)												
Lane Group Flow (vph)	202	74	52	1	142	482	79	1260	1	225	922	115
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	9.5	50.9	50.9	9.5	9.5	9.5	9.5	41.9	41.9	9.5	49.8	49.8
Total Split (s)	24.0	50.9	50.9	9.5	36.4	36.4	16.8	43.6	43.6	26.0	52.8	52.8
Total Split (%)	18.5%	39.2%	39.2%	7.3%	28.0%	28.0%	12.9%	33.5%	33.5%	20.0%	40.6%	40.6%
Maximum Green (s)	19.5	46.4	46.4	5.0	31.9	31.9	12.3	39.1	39.1	21.5	48.3	48.3
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)		7.0	7.0					7.0	7.0		7.0	7.0
Flash Dont Walk (s)		39.4	39.4					30.4	30.4		38.3	38.3
Pedestrian Calls (#/hr)		0	0					0	0		0	0
Act Effct Green (s)	17.0	41.4	41.4	5.1	21.5	21.5	9.9	40.1	40.1	18.5	51.5	51.5
Actuated g/C Ratio	0.15	0.36	0.36	0.04	0.19	0.19	0.09	0.35	0.35	0.16	0.45	0.45
v/c Ratio	0.78	0.11	0.08	0.01	0.41	0.89	0.52	0.71	0.00	0.79	0.41	0.15
Control Delay	69.9	25.5	0.2	60.0	45.0	36.7	66.6	37.9	0.0	69.0	25.5	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.9	25.5	0.2	60.0	45.0	36.7	66.6	37.9	0.0	69.0	25.5	4.2
LOS	E	C	A	E	D	D	E	D	A	E	C	A
Approach Delay		48.9			38.6			39.5			31.3	
Approach LOS		D			D			D			C	

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 115.4
Natural Cycle: 120
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 37.3 — Intersection LOS: D
Intersection Capacity Utilization 70.8% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 4: Hwy 79 & Scott Rd

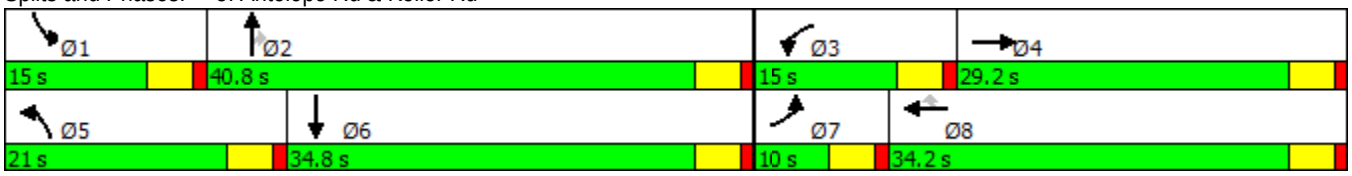


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	64	29	79	119	101	132	363	55	66	147	10
Future Volume (vph)	10	64	29	79	119	101	132	363	55	66	147	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	120		0	195		0	110		110	120		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.953				0.850			0.850		0.990	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1775	0	1770	1863	1583	1770	1863	1583	1770	1844	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1775	0	1770	1863	1583	1770	1863	1583	1770	1844	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22				164			164		4	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1361			1774			5440			744	
Travel Time (s)		30.9			40.3			123.6			16.9	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	11	68	31	84	127	107	140	386	59	70	156	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	99	0	84	127	107	140	386	59	70	167	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	29.2		9.5	26.9	26.9	9.5	30.9	30.9	9.5	29.2	
Total Split (s)	10.0	29.2		15.0	34.2	34.2	21.0	40.8	40.8	15.0	34.8	
Total Split (%)	10.0%	29.2%		15.0%	34.2%	34.2%	21.0%	40.8%	40.8%	15.0%	34.8%	
Maximum Green (s)	5.5	24.7		10.5	29.7	29.7	16.5	36.3	36.3	10.5	30.3	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		17.7			15.4	15.4		19.4	19.4		17.7	
Pedestrian Calls (#/hr)		0			0	0		0	0		0	
Act Effct Green (s)	5.6	9.2		8.7	17.9	17.9	11.5	38.6	38.6	8.3	32.7	
Actuated g/C Ratio	0.07	0.12		0.11	0.23	0.23	0.15	0.50	0.50	0.11	0.42	
v/c Ratio	0.09	0.43		0.42	0.30	0.22	0.53	0.42	0.07	0.37	0.21	
Control Delay	39.7	34.0		41.9	27.7	2.6	40.2	17.7	0.1	40.9	18.0	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	39.7	34.0		41.9	27.7	2.6	40.2	17.7	0.1	40.9	18.0	
LOS	D	C		D	C	A	D	B	A	D	B	
Approach Delay		34.5			23.0			21.3			24.7	
Approach LOS		C			C			C			C	

Intersection Summary	
Area Type: Other	
Cycle Length: 100	
Actuated Cycle Length: 77.7	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.53	
Intersection Signal Delay: 23.5	Intersection LOS: C
Intersection Capacity Utilization 45.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 5: Antelope Rd & Keller Rd



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	50	256	261	15	86	159
Future Volume (vph)	50	256	261	15	86	159
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		20	150	
Storage Lanes	1	1		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	1583	1863	1583	1770	1863
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		269		7		
Link Speed (mph)	30		30			30
Link Distance (ft)	2823		806			5440
Travel Time (s)	64.2		18.3			123.6
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	269	275	16	91	167
Shared Lane Traffic (%)						
Lane Group Flow (vph)	53	269	275	16	91	167
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	24		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (ft)	20	20	100	20	20	100
Trailing Detector (ft)	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0
Detector 1 Size(ft)	20	20	6	20	20	6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)			94			94
Detector 2 Size(ft)			6			6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	34.9	34.9	9.5	22.5
Total Split (s)	32.0	32.0	47.0	47.0	21.0	68.0
Total Split (%)	32.0%	32.0%	47.0%	47.0%	21.0%	68.0%
Maximum Green (s)	27.5	27.5	42.5	42.5	16.5	63.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max
Walk Time (s)			7.0	7.0		
Flash Dont Walk (s)			23.4	23.4		
Pedestrian Calls (#/hr)			0	0		
Act Effct Green (s)	8.4	8.4	51.8	51.8	9.4	63.5
Actuated g/C Ratio	0.10	0.10	0.64	0.64	0.12	0.78
v/c Ratio	0.29	0.67	0.23	0.02	0.44	0.11
Control Delay	37.3	13.3	8.4	6.3	40.2	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.3	13.3	8.4	6.3	40.2	2.6
LOS	D	B	A	A	D	A
Approach Delay	17.3		8.3			15.8
Approach LOS	B		A			B

Intersection Summary	
Area Type: Other	
Cycle Length: 100	
Actuated Cycle Length: 80.9	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.67	
Intersection Signal Delay: 13.9	Intersection LOS: B
Intersection Capacity Utilization 37.1%	ICU Level of Service A
Analysis Period (min) 15	

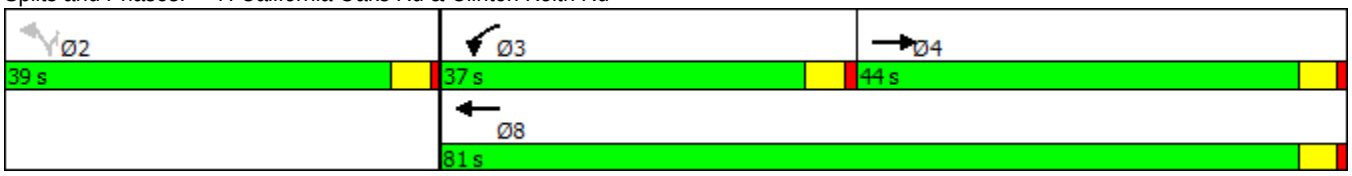
Splits and Phases: 6: Antelope Rd & Baxter Rd

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	982	117	423	956	198	710
Future Volume (vph)	982	117	423	956	198	710
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	225		100	0
Storage Lanes		0	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.95	0.95	1.00	0.95	0.97	0.91
Frt	0.984				0.904	0.850
Flt Protected			0.950		0.982	
Satd. Flow (prot)	3483	0	1770	3539	3208	1441
Flt Permitted			0.950		0.982	
Satd. Flow (perm)	3483	0	1770	3539	3208	1441
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	11				362	362
Link Speed (mph)	30			30	30	
Link Distance (ft)	2233			3569	625	
Travel Time (s)	50.8			81.1	14.2	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	1002	119	432	976	202	724
Shared Lane Traffic (%)						50%
Lane Group Flow (vph)	1121	0	432	976	564	362
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	24	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Number of Detectors	2		1	2	1	1
Detector Template	Thru		Left	Thru	Left	Right
Leading Detector (ft)	100		20	100	20	20
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	6		20	6	20	20
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Prot	NA	Perm	Perm
Protected Phases	4		3	8		
Permitted Phases					2	2

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	4		3	8	2	2
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0
Minimum Split (s)	36.6		9.5	22.5	37.2	37.2
Total Split (s)	44.0		37.0	81.0	39.0	39.0
Total Split (%)	36.7%		30.8%	67.5%	32.5%	32.5%
Maximum Green (s)	39.5		32.5	76.5	34.5	34.5
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5		4.5	4.5	4.5	4.5
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	None	Max	Max
Walk Time (s)	7.0				7.0	7.0
Flash Dont Walk (s)	25.1				25.7	25.7
Pedestrian Calls (#/hr)	0				0	0
Act Effct Green (s)	39.5		31.1	75.2	34.5	34.5
Actuated g/C Ratio	0.33		0.26	0.63	0.29	0.29
v/c Ratio	0.96		0.93	0.44	0.47	0.54
Control Delay	57.5		71.0	11.7	13.3	6.6
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	57.5		71.0	11.7	13.3	6.6
LOS	E		E	B	B	A
Approach Delay	57.5			29.9	10.7	
Approach LOS	E			C	B	

Intersection Summary	
Area Type: Other	
Cycle Length: 120	
Actuated Cycle Length: 118.7	
Natural Cycle: 105	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 33.7	Intersection LOS: C
Intersection Capacity Utilization 78.7%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 7: California Oaks Rd & Clinton Keith Rd

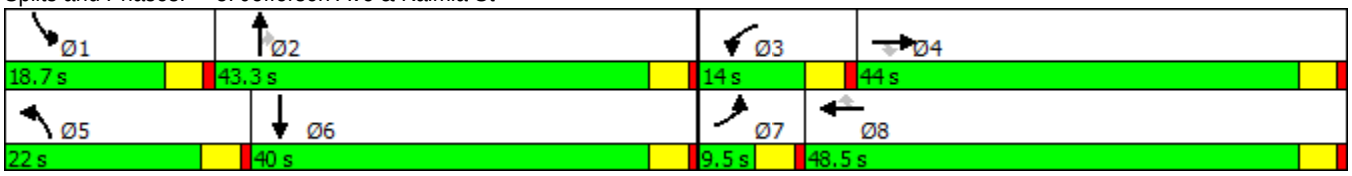


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	508	180	134	447	278	251	440	461	149	143	20
Future Volume (vph)	14	508	180	134	447	278	251	440	461	149	143	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		140	235		0	205		0	145		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Frt			0.850			0.850			0.850		0.981	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	1863	1583	1770	1863	1583	1770	3472	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3539	1583	1770	1863	1583	1770	1863	1583	1770	3472	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			186			287			231		13	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1399			684			2782			1004	
Travel Time (s)		31.8			15.5			63.2			22.8	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	14	524	186	138	461	287	259	454	475	154	147	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	524	186	138	461	287	259	454	475	154	168	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	44.0	44.0	9.5	34.9	34.9	9.5	38.6	38.6	9.5	39.5	
Total Split (s)	9.5	44.0	44.0	14.0	48.5	48.5	22.0	43.3	43.3	18.7	40.0	
Total Split (%)	7.9%	36.7%	36.7%	11.7%	40.4%	40.4%	18.3%	36.1%	36.1%	15.6%	33.3%	
Maximum Green (s)	5.0	39.5	39.5	9.5	44.0	44.0	17.5	38.8	38.8	14.2	35.5	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		32.5	32.5		23.4	23.4		27.1	27.1		28.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	
Act Effct Green (s)	5.0	25.3	25.3	9.6	36.0	36.0	17.6	40.5	40.5	12.8	35.8	
Actuated g/C Ratio	0.05	0.24	0.24	0.09	0.34	0.34	0.17	0.38	0.38	0.12	0.34	
v/c Ratio	0.17	0.62	0.36	0.87	0.73	0.40	0.88	0.64	0.64	0.72	0.14	
Control Delay	57.8	39.0	6.2	93.7	39.2	4.8	75.7	34.5	19.4	66.2	25.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	57.8	39.0	6.2	93.7	39.2	4.8	75.7	34.5	19.4	66.2	25.0	
LOS	E	D	A	F	D	A	E	C	B	E	C	
Approach Delay		30.9			36.5			37.5			44.7	
Approach LOS		C			D			D			D	

Intersection Summary	
Area Type: Other	
Cycle Length: 120	
Actuated Cycle Length: 106.4	
Natural Cycle: 115	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 36.4	Intersection LOS: D
Intersection Capacity Utilization 74.1%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 8: Jefferson Ave & Kalmia St

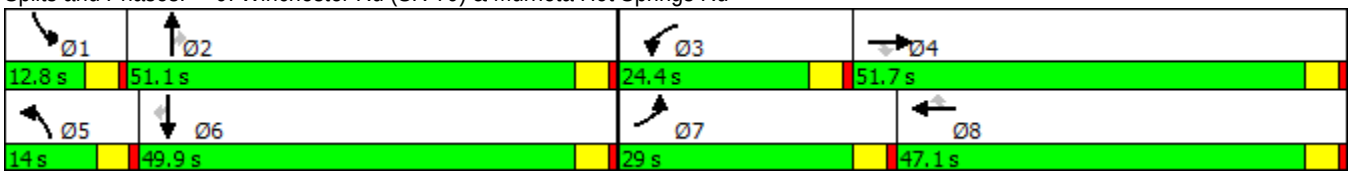


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	545	705	175	310	676	93	161	1570	179	172	1059	508
Future Volume (vph)	545	705	175	310	676	93	161	1570	179	172	1059	508
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	195		200	195		200	205		0	210		0
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	3433	3539	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	3539	1583	3433	5085	1583	3433	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			144			117			132			343
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1422			1339			680			585	
Travel Time (s)		32.3			30.4			15.5			13.3	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	562	727	180	320	697	96	166	1619	185	177	1092	524
Shared Lane Traffic (%)												
Lane Group Flow (vph)	562	727	180	320	697	96	166	1619	185	177	1092	524
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	9.5	9.5	9.5	47.1	47.1	9.5	44.4	44.4	9.5	44.9	44.9
Total Split (s)	29.0	51.7	51.7	24.4	47.1	47.1	14.0	51.1	51.1	12.8	49.9	49.9
Total Split (%)	20.7%	36.9%	36.9%	17.4%	33.6%	33.6%	10.0%	36.5%	36.5%	9.1%	35.6%	35.6%
Maximum Green (s)	24.5	47.2	47.2	19.9	42.6	42.6	9.5	46.6	46.6	8.3	45.4	45.4
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)					7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)					35.6	35.6		32.9	32.9		33.4	33.4
Pedestrian Calls (#/hr)					0	0		0	0		0	0
Act Effct Green (s)	23.9	39.7	39.7	16.7	32.6	32.6	9.3	46.7	46.7	8.3	45.8	45.8
Actuated g/C Ratio	0.18	0.31	0.31	0.13	0.25	0.25	0.07	0.36	0.36	0.06	0.35	0.35
v/c Ratio	0.89	0.47	0.31	0.72	0.78	0.20	0.67	0.88	0.28	0.80	0.61	0.67
Control Delay	69.4	37.5	10.0	64.7	51.9	4.5	74.1	46.4	11.4	86.9	37.2	17.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.4	37.5	10.0	64.7	51.9	4.5	74.1	46.4	11.4	86.9	37.2	17.2
LOS	E	D	B	E	D	A	E	D	B	F	D	B
Approach Delay		46.3			51.5			45.4			36.3	
Approach LOS		D			D			D			D	

Intersection Summary	
Area Type: Other	
Cycle Length: 140	
Actuated Cycle Length: 129.6	
Natural Cycle: 135	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 44.1	Intersection LOS: D
Intersection Capacity Utilization 84.5%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 9: Winchester Rd (SR-79) & Murrieta Hot Springs Rd

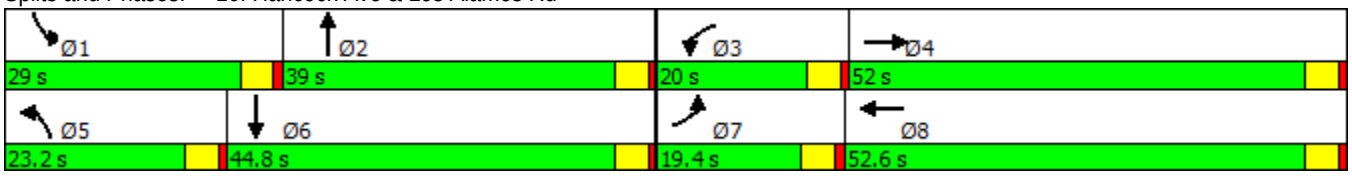


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	131	994	53	151	630	273	171	336	315	492	171	115
Future Volume (vph)	131	994	53	151	630	273	171	336	315	492	171	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	100		0	100		0	225		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	0.97	1.00	1.00
Frt		0.992			0.955			0.927			0.940	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3511	0	1770	3380	0	1770	3281	0	3433	1751	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3511	0	1770	3380	0	1770	3281	0	3433	1751	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			53			162			24	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		440			1059			599			686	
Travel Time (s)		10.0			24.1			13.6			15.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	138	1046	56	159	663	287	180	354	332	518	180	121
Shared Lane Traffic (%)												
Lane Group Flow (vph)	138	1102	0	159	950	0	180	686	0	518	301	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	36.4		9.5	36.4		9.5	36.9		9.5	36.4	
Total Split (s)	19.4	52.0		20.0	52.6		23.2	39.0		29.0	44.8	
Total Split (%)	13.9%	37.1%		14.3%	37.6%		16.6%	27.9%		20.7%	32.0%	
Maximum Green (s)	14.9	47.5		15.5	48.1		18.7	34.5		24.5	40.3	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Max		None	Max	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		24.9			24.9			25.4			24.9	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	13.8	46.0		14.8	47.0		17.1	34.6		23.4	40.9	
Actuated g/C Ratio	0.10	0.34		0.11	0.34		0.12	0.25		0.17	0.30	
v/c Ratio	0.78	0.93		0.84	0.79		0.81	0.72		0.88	0.56	
Control Delay	88.3	58.2		93.6	44.3		86.0	40.8		73.1	42.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	88.3	58.2		93.6	44.3		86.0	40.8		73.1	42.6	
LOS	F	E		F	D		F	D		E	D	
Approach Delay		61.6			51.3			50.2			61.9	
Approach LOS		E			D			D			E	

Intersection Summary	
Area Type: Other	
Cycle Length: 140	
Actuated Cycle Length: 136.8	
Natural Cycle: 115	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 56.4	Intersection LOS: E
Intersection Capacity Utilization 86.0%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 10: Hancock Ave & Los Alamos Rd

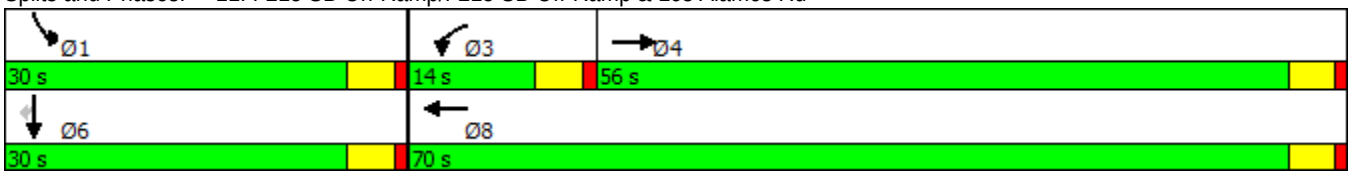


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1617	281	153	793	0	0	0	0	199	7	455
Future Volume (vph)	0	1617	281	153	793	0	0	0	0	199	7	455
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		95	100		0	0		0	305		305
Storage Lanes	0		1	2		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	0.97	0.95	1.00	1.00	1.00	1.00	0.95	0.91	0.95
Frt		0.978									0.867	0.850
Flt Protected				0.950						0.950	0.996	
Satd. Flow (prot)	0	4973	0	3433	3539	0	0	0	0	1681	1464	1504
Flt Permitted				0.950						0.950	0.996	
Satd. Flow (perm)	0	4973	0	3433	3539	0	0	0	0	1681	1464	1504
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		50									210	210
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1059			394			642			451	
Travel Time (s)		24.1			9.0			14.6			10.3	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	1684	293	159	826	0	0	0	0	207	7	474
Shared Lane Traffic (%)										10%		47%
Lane Group Flow (vph)	0	1977	0	159	826	0	0	0	0	186	251	251
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2		1	2					1	2	1
Detector Template		Thru		Left	Thru					Left	Thru	Right
Leading Detector (ft)		100		20	100					20	100	20
Trailing Detector (ft)		0		0	0					0	0	0
Detector 1 Position(ft)		0		0	0					0	0	0
Detector 1 Size(ft)		6		20	6					20	6	20
Detector 1 Type		Cl+Ex		Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0		0.0	0.0					0.0	0.0	0.0
Detector 1 Queue (s)		0.0		0.0	0.0					0.0	0.0	0.0
Detector 1 Delay (s)		0.0		0.0	0.0					0.0	0.0	0.0
Detector 2 Position(ft)		94			94						94	
Detector 2 Size(ft)		6			6						6	
Detector 2 Type		Cl+Ex			Cl+Ex						Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0						0.0	
Turn Type		NA		Prot	NA					Prot	NA	Perm
Protected Phases		4		3	8					1	6	
Permitted Phases												6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		4		3	8					1	6	6
Switch Phase												
Minimum Initial (s)		5.0		5.0	5.0					5.0	5.0	5.0
Minimum Split (s)		34.6		9.5	28.4					9.5	9.5	9.5
Total Split (s)		56.0		14.0	70.0					30.0	30.0	30.0
Total Split (%)		56.0%		14.0%	70.0%					30.0%	30.0%	30.0%
Maximum Green (s)		51.5		9.5	65.5					25.5	25.5	25.5
Yellow Time (s)		3.5		3.5	3.5					3.5	3.5	3.5
All-Red Time (s)		1.0		1.0	1.0					1.0	1.0	1.0
Lost Time Adjust (s)		0.0		0.0	0.0					0.0	0.0	0.0
Total Lost Time (s)		4.5		4.5	4.5					4.5	4.5	4.5
Lead/Lag		Lag		Lead								
Lead-Lag Optimize?		Yes		Yes								
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	3.0
Recall Mode		None		None	None					None	Max	Max
Walk Time (s)		7.0			7.0							
Flash Dont Walk (s)		23.1			16.9							
Pedestrian Calls (#/hr)		0			0							
Act Effct Green (s)		49.9		8.8	63.2					25.6	25.6	25.6
Actuated g/C Ratio		0.51		0.09	0.65					0.26	0.26	0.26
v/c Ratio		0.77		0.51	0.36					0.42	0.47	0.46
Control Delay		21.4		49.1	8.4					34.4	10.2	10.0
Queue Delay		0.0		0.0	0.0					0.0	0.0	0.0
Total Delay		21.4		49.1	8.4					34.4	10.2	10.0
LOS		C		D	A					C	B	B
Approach Delay		21.4			15.0						16.7	
Approach LOS		C			B						B	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 97.8	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 18.8	Intersection LOS: B
Intersection Capacity Utilization 63.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 11: I-215 SB On-Ramp/I-215 SB Off-Ramp & Los Alamos Rd

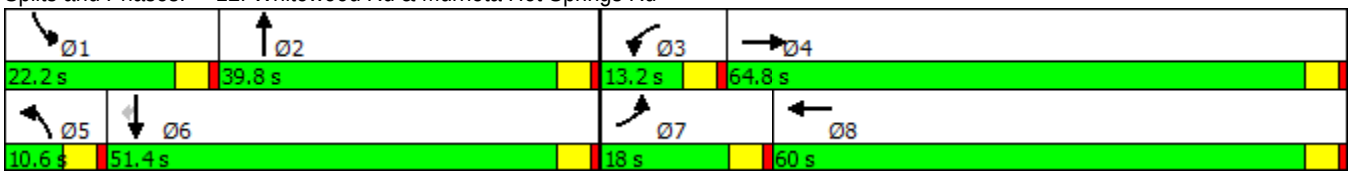


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	162	1676	39	38	1702	423	22	19	39	427	25	109
Future Volume (vph)	162	1676	39	38	1702	423	22	19	39	427	25	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	215		0	150		0	150		0	225		0
Storage Lanes	1		0	1		0	1		0	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	0.97	1.00	1.00
Frt		0.997			0.970			0.900				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	5070	0	1770	4933	0	1770	1676	0	3433	1863	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	5070	0	1770	4933	0	1770	1676	0	3433	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			51			40				117
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		764			996			580			564	
Travel Time (s)		17.4			22.6			13.2			12.8	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	167	1728	40	39	1755	436	23	20	40	440	26	112
Shared Lane Traffic (%)												
Lane Group Flow (vph)	167	1768	0	39	2191	0	23	60	0	440	26	112
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	26.6		9.5	32.6		9.5	38.6		9.5	38.9	38.9
Total Split (s)	18.0	64.8		13.2	60.0		10.6	39.8		22.2	51.4	51.4
Total Split (%)	12.9%	46.3%		9.4%	42.9%		7.6%	28.4%		15.9%	36.7%	36.7%
Maximum Green (s)	13.5	60.3		8.7	55.5		6.1	35.3		17.7	46.9	46.9
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		15.1			21.1			27.1			27.4	27.4
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	13.5	63.3		7.7	55.5		6.0	35.3		17.7	51.1	51.1
Actuated g/C Ratio	0.10	0.45		0.06	0.40		0.04	0.25		0.13	0.36	0.36
v/c Ratio	0.98	0.77		0.40	1.10		0.31	0.13		1.01	0.04	0.17
Control Delay	126.8	35.7		75.8	93.5		75.6	18.3		106.4	31.2	5.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	126.8	35.7		75.8	93.5		75.6	18.3		106.4	31.2	5.6
LOS	F	D		E	F		E	B		F	C	A
Approach Delay		43.6			93.2			34.2			83.5	
Approach LOS		D			F			C			F	

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 140	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.10	
Intersection Signal Delay: 71.1	Intersection LOS: E
Intersection Capacity Utilization 81.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 12: Whitewood Rd & Murrieta Hot Springs Rd

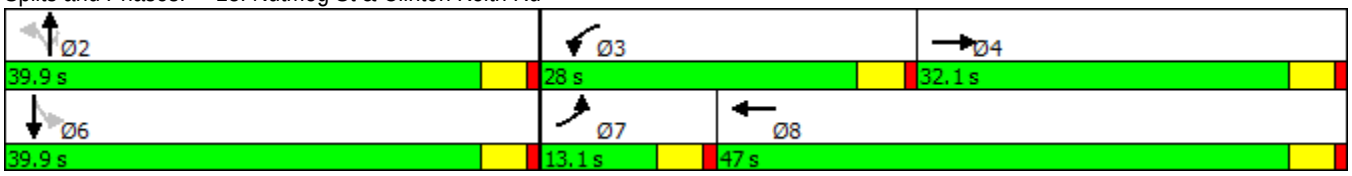


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	778	76	338	687	115	66	43	241	100	45	22
Future Volume (vph)	52	778	76	338	687	115	66	43	241	100	45	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	225		0	180		0	50		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.987			0.978				0.850		0.950	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3493	0	1770	3461	0	1770	1863	1583	1770	1770	0
Flt Permitted	0.950			0.950			0.712			0.728		
Satd. Flow (perm)	1770	3493	0	1770	3461	0	1326	1863	1583	1356	1770	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			24				248		23	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		471			2233			1168			1110	
Travel Time (s)		10.7			50.8			26.5			25.2	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	54	802	78	348	708	119	68	44	248	103	46	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	54	880	0	348	827	0	68	44	248	103	69	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2		2	6		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	32.1		9.5	9.5		38.6	38.6	38.6	9.5	9.5	
Total Split (s)	13.1	32.1		28.0	47.0		39.9	39.9	39.9	39.9	39.9	
Total Split (%)	13.1%	32.1%		28.0%	47.0%		39.9%	39.9%	39.9%	39.9%	39.9%	
Maximum Green (s)	8.6	27.6		23.5	42.5		35.4	35.4	35.4	35.4	35.4	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	
Walk Time (s)		7.0					7.0	7.0	7.0			
Flash Dont Walk (s)		20.6					27.1	27.1	27.1			
Pedestrian Calls (#/hr)		0					0	0	0			
Act Effct Green (s)	7.6	27.0		21.9	43.5		35.5	35.5	35.5	35.5	35.5	
Actuated g/C Ratio	0.08	0.28		0.22	0.44		0.36	0.36	0.36	0.36	0.36	
v/c Ratio	0.39	0.91		0.88	0.53		0.14	0.07	0.34	0.21	0.11	
Control Delay	52.2	48.4		61.1	21.4		23.0	21.8	4.4	23.9	16.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	52.2	48.4		61.1	21.4		23.0	21.8	4.4	23.9	16.1	
LOS	D	D		E	C		C	C	A	C	B	
Approach Delay		48.6			33.2			10.0			20.8	
Approach LOS		D			C			B			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 97.9	
Natural Cycle: 85	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 34.7	Intersection LOS: C
Intersection Capacity Utilization 66.1%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 13: Nutmeg St & Clinton Keith Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	307	113	16	315	21	124	49	35	12	23	9
Future Volume (vph)	15	307	113	16	315	21	124	49	35	12	23	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.965			0.992			0.977			0.973	
Flt Protected		0.998			0.998			0.971			0.986	
Satd. Flow (prot)	0	1794	0	0	1844	0	0	1767	0	0	1787	0
Flt Permitted		0.998			0.998			0.971			0.986	
Satd. Flow (perm)	0	1794	0	0	1844	0	0	1767	0	0	1787	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		966			752			675			676	
Travel Time (s)		22.0			17.1			15.3			15.4	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	17	349	128	18	358	24	141	56	40	14	26	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	494	0	0	400	0	0	237	0	0	50	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Stop			Stop	

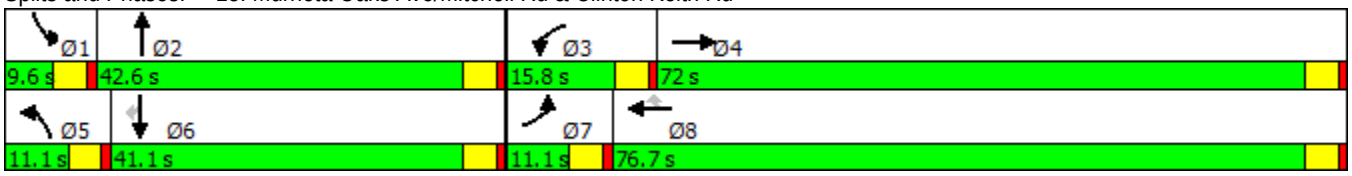
Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 53.4%	ICU Level of Service A
Analysis Period (min) 15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	1701	23	125	1439	2	28	2	106	5	3	14
Future Volume (vph)	29	1701	23	125	1439	2	28	2	106	5	3	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		210	0		0	200		200
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.91	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt		0.998				0.850		0.853				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3532	0	1770	5085	1583	1770	1589	0	3433	1863	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3532	0	1770	5085	1583	1770	1589	0	3433	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				82		107				117
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1884			2845			958			1018	
Travel Time (s)		42.8			64.7			21.8			23.1	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	29	1718	23	126	1454	2	28	2	107	5	3	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	1741	0	126	1454	2	28	109	0	5	3	14
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	26.1		9.5	35.5	35.5	9.5	41.5		9.5	38.4	38.4
Total Split (s)	11.1	72.0		15.8	76.7	76.7	11.1	42.6		9.6	41.1	41.1
Total Split (%)	7.9%	51.4%		11.3%	54.8%	54.8%	7.9%	30.4%		6.9%	29.4%	29.4%
Maximum Green (s)	6.6	67.5		11.3	72.2	72.2	6.6	38.1		5.1	36.6	36.6
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	Max		None	Max	Max
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		14.6			24.0	24.0		30.0			26.9	26.9
Pedestrian Calls (#/hr)		0			0	0		0			0	0
Act Effct Green (s)	6.4	67.6		11.3	76.9	76.9	6.4	41.9		5.1	37.3	37.3
Actuated g/C Ratio	0.05	0.50		0.08	0.56	0.56	0.05	0.31		0.04	0.27	0.27
v/c Ratio	0.35	0.99		0.86	0.51	0.00	0.34	0.19		0.04	0.01	0.03
Control Delay	76.3	54.2		106.4	20.1	0.0	75.7	7.6		65.8	38.3	0.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	76.3	54.2		106.4	20.1	0.0	75.7	7.6		65.8	38.3	0.1
LOS	E	D		F	C	A	E	A		E	D	A
Approach Delay		54.6			26.9			21.5			20.2	
Approach LOS		D			C			C			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 136.2	
Natural Cycle: 140	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.99	
Intersection Signal Delay: 40.6	Intersection LOS: D
Intersection Capacity Utilization 74.1%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 15: Murrieta Oaks Ave/Mitchell Rd & Clinton Keith Rd

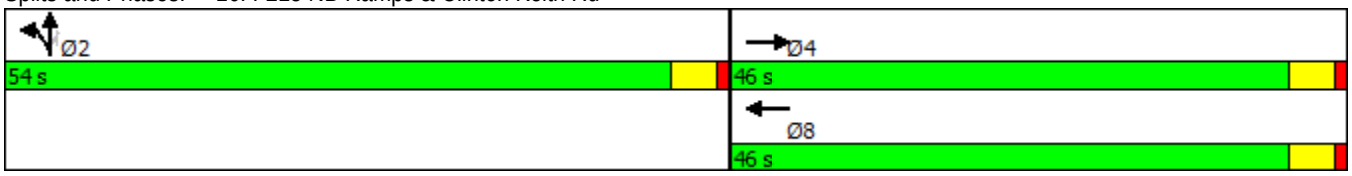


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1035	487	0	831	87	374	0	547	0	0	0
Future Volume (vph)	0	1035	487	0	831	87	374	0	547	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		160	0		0	0		0	0		0
Storage Lanes	0		1	0		1	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Frt			0.850			0.850		0.967	0.850			
Flt Protected								0.962				
Satd. Flow (prot)	0	5085	1583	0	5085	1583	0	1646	1504	0	0	0
Flt Permitted								0.962				
Satd. Flow (perm)	0	5085	1583	0	5085	1583	0	1646	1504	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			342			88		20	37			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2845			3447			1631			722	
Travel Time (s)		64.7			78.3			37.1			16.4	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	0	1045	492	0	839	88	378	0	553	0	0	0
Shared Lane Traffic (%)									19%			
Lane Group Flow (vph)	0	1045	492	0	839	88	0	483	448	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2	1		2	1	1	2	1			
Detector Template		Thru	Right		Thru	Right	Left	Thru	Right			
Leading Detector (ft)		100	20		100	20	20	100	20			
Trailing Detector (ft)		0	0		0	0	0	0	0			
Detector 1 Position(ft)		0	0		0	0	0	0	0			
Detector 1 Size(ft)		6	20		6	20	20	6	20			
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0			
Detector 1 Queue (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0			
Detector 1 Delay (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0			
Detector 2 Position(ft)		94			94			94				
Detector 2 Size(ft)		6			6			6				
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				
Turn Type		NA	Free		NA	Free	Split	NA	Perm			
Protected Phases		4			8		2	2				
Permitted Phases			Free			Free			2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		4			8		2	2	2			
Switch Phase												
Minimum Initial (s)		5.0			5.0		5.0	5.0	5.0			
Minimum Split (s)		43.5			9.5		9.5	9.5	9.5			
Total Split (s)		46.0			46.0		54.0	54.0	54.0			
Total Split (%)		46.0%			46.0%		54.0%	54.0%	54.0%			
Maximum Green (s)		41.5			41.5		49.5	49.5	49.5			
Yellow Time (s)		3.5			3.5		3.5	3.5	3.5			
All-Red Time (s)		1.0			1.0		1.0	1.0	1.0			
Lost Time Adjust (s)		0.0			0.0			0.0	0.0			
Total Lost Time (s)		4.5			4.5			4.5	4.5			
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0			
Recall Mode		None			None		Max	Max	Max			
Walk Time (s)		7.0										
Flash Dont Walk (s)		32.0										
Pedestrian Calls (#/hr)		0										
Act Effct Green (s)		26.4	85.1		26.4	85.1		49.7	49.7			
Actuated g/C Ratio		0.31	1.00		0.31	1.00		0.58	0.58			
v/c Ratio		0.66	0.31		0.53	0.06		0.50	0.50			
Control Delay		27.5	0.5		25.3	0.1		13.1	12.8			
Queue Delay		0.0	0.0		0.0	0.0		0.0	0.0			
Total Delay		27.5	0.5		25.3	0.1		13.1	12.8			
LOS		C	A		C	A		B	B			
Approach Delay		18.9			22.9			13.0				
Approach LOS		B			C			B				

Intersection Summary	
Area Type: Other	
Cycle Length: 100	
Actuated Cycle Length: 85.1	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.66	
Intersection Signal Delay: 18.3	Intersection LOS: B
Intersection Capacity Utilization 59.4%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 16: I-215 NB Ramps & Clinton Keith Rd

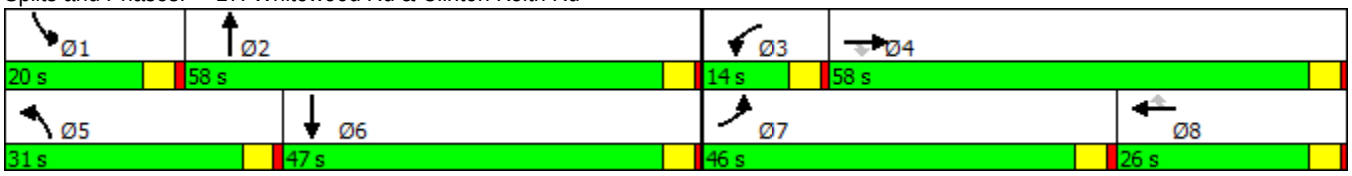


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	614	761	202	102	439	70	165	513	128	82	246	272
Future Volume (vph)	614	761	202	102	439	70	165	513	128	82	246	272
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	260		0	0		0	310		0	100		0
Storage Lanes	2		1	2		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.91	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.970			0.921	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	1583	3433	5085	1583	1770	3433	0	1770	3260	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3539	1583	3433	5085	1583	1770	3433	0	1770	3260	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			207			142		23			186	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3447			893			3330			2871	
Travel Time (s)		78.3			20.3			75.7			65.3	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	640	793	210	106	457	73	172	534	133	85	256	283
Shared Lane Traffic (%)												
Lane Group Flow (vph)	640	793	210	106	457	73	172	667	0	85	539	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	29.2	29.2	29.2	9.5	9.5	9.5	9.5	46.4		9.5	43.5	
Total Split (s)	46.0	58.0	58.0	14.0	26.0	26.0	31.0	58.0		20.0	47.0	
Total Split (%)	30.7%	38.7%	38.7%	9.3%	17.3%	17.3%	20.7%	38.7%		13.3%	31.3%	
Maximum Green (s)	41.5	53.5	53.5	9.5	21.5	21.5	26.5	53.5		15.5	42.5	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Max		None	Max	
Walk Time (s)	7.0	7.0	7.0					7.0			7.0	
Flash Dont Walk (s)	17.7	17.7	17.7					34.9			32.0	
Pedestrian Calls (#/hr)	0	0	0					0			0	
Act Effct Green (s)	29.7	38.5	38.5	8.7	17.5	17.5	18.1	54.0		11.4	47.3	
Actuated g/C Ratio	0.23	0.29	0.29	0.07	0.13	0.13	0.14	0.41		0.09	0.36	
v/c Ratio	0.82	0.76	0.34	0.46	0.67	0.22	0.70	0.47		0.55	0.42	
Control Delay	57.8	47.1	6.0	68.4	60.2	1.5	70.6	30.0		73.3	23.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	57.8	47.1	6.0	68.4	60.2	1.5	70.6	30.0		73.3	23.0	
LOS	E	D	A	E	E	A	E	C		E	C	
Approach Delay		46.0			54.8			38.3			29.9	
Approach LOS		D			D			D			C	

Intersection Summary	
Area Type: Other	
Cycle Length: 150	
Actuated Cycle Length: 130.8	
Natural Cycle: 95	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 43.1	Intersection LOS: D
Intersection Capacity Utilization 65.7%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 17: Whitewood Rd & Clinton Keith Rd

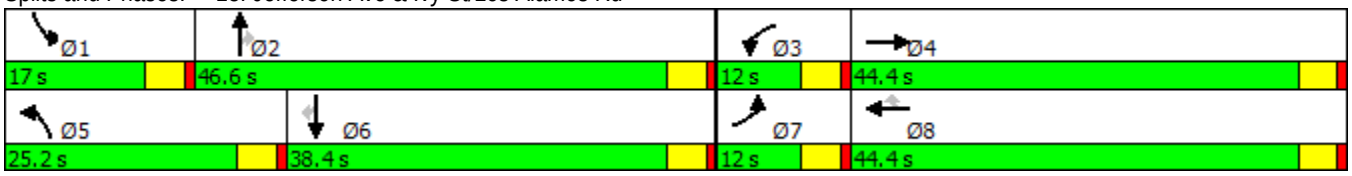


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	78	314	138	76	171	169	163	1020	456	132	305	32
Future Volume (vph)	78	314	138	76	171	169	163	1020	456	132	305	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		0	205		0	230		215	250		220
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.954				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3376	0	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3376	0	1770	1863	1583	1770	3539	1583	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		62				182			368			136
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1401			1395			2768			2782	
Travel Time (s)		31.8			31.7			62.9			63.2	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	84	338	148	82	184	182	175	1097	490	142	328	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	84	486	0	82	184	182	175	1097	490	142	328	34
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	44.4		9.5	44.4	44.4	9.5	38.4	38.4	9.5	34.4	34.4
Total Split (s)	12.0	44.4		12.0	44.4	44.4	25.2	46.6	46.6	17.0	38.4	38.4
Total Split (%)	10.0%	37.0%		10.0%	37.0%	37.0%	21.0%	38.8%	38.8%	14.2%	32.0%	32.0%
Maximum Green (s)	7.5	39.9		7.5	39.9	39.9	20.7	42.1	42.1	12.5	33.9	33.9
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		32.9			32.9	32.9		26.9	26.9		22.9	22.9
Pedestrian Calls (#/hr)		0			0	0		0	0		0	0
Act Effct Green (s)	7.5	18.3		7.4	18.2	18.2	14.7	42.2	42.2	11.6	39.2	39.2
Actuated g/C Ratio	0.08	0.19		0.08	0.19	0.19	0.15	0.43	0.43	0.12	0.40	0.40
v/c Ratio	0.62	0.71		0.61	0.53	0.41	0.66	0.72	0.55	0.68	0.23	0.05
Control Delay	66.3	38.5		65.6	41.6	8.0	51.6	26.9	8.2	59.0	21.6	0.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.3	38.5		65.6	41.6	8.0	51.6	26.9	8.2	59.0	21.6	0.1
LOS	E	D		E	D	A	D	C	A	E	C	A
Approach Delay		42.6			32.4			24.2			30.7	
Approach LOS		D			C			C			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 97.6	
Natural Cycle: 105	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 29.5	Intersection LOS: C
Intersection Capacity Utilization 67.8%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 18: Jefferson Ave & Ivy St/Los Alamos Rd

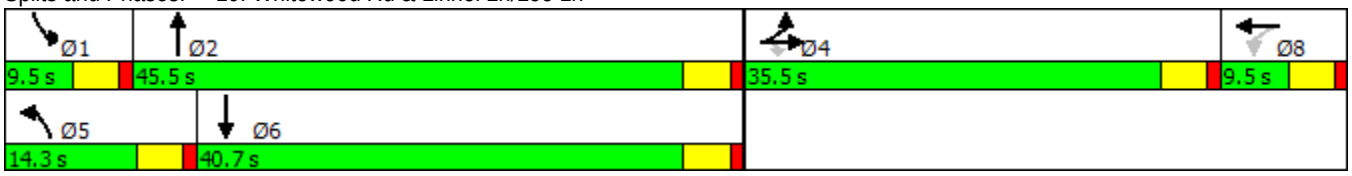


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	103	0	83	0	0	4	71	988	4	7	516	45
Future Volume (vph)	103	0	83	0	0	4	71	988	4	7	516	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	135		0	0		0	205		0	205		0
Storage Lanes	1		1	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.865			0.999			0.988	
Flt Protected	0.950						0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	0	1611	0	1770	3536	0	1770	3497	0
Flt Permitted	0.950						0.950			0.950		
Satd. Flow (perm)	1770	1863	1583	0	1611	0	1770	3536	0	1770	3497	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			362		394						10	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1415			1455			2871			2884	
Travel Time (s)		32.2			33.1			65.3			65.5	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	107	0	86	0	0	4	74	1029	4	7	538	47
Shared Lane Traffic (%)												
Lane Group Flow (vph)	107	0	86	0	4	0	74	1033	0	7	585	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split		Perm		NA		Prot	NA		Prot	NA	
Protected Phases	4	4			8		5	2		1	6	
Permitted Phases			4	8								

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	35.5	35.5	35.5	9.5	9.5		9.5	27.4		9.5	32.1	
Total Split (s)	35.5	35.5	35.5	9.5	9.5		14.3	45.5		9.5	40.7	
Total Split (%)	35.5%	35.5%	35.5%	9.5%	9.5%		14.3%	45.5%		9.5%	40.7%	
Maximum Green (s)	31.0	31.0	31.0	5.0	5.0		9.8	41.0		5.0	36.2	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5		4.5		4.5	4.5		4.5	4.5	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Max		None	Max	
Walk Time (s)	7.0	7.0	7.0					7.0			7.0	
Flash Dont Walk (s)	24.0	24.0	24.0					15.9			20.6	
Pedestrian Calls (#/hr)	0	0	0					0			0	
Act Effct Green (s)	9.7		9.7		5.0		8.0	49.3		5.0	40.4	
Actuated g/C Ratio	0.14		0.14		0.07		0.11	0.69		0.07	0.57	
v/c Ratio	0.45		0.16		0.01		0.37	0.42		0.06	0.29	
Control Delay	34.7		0.7		0.0		35.7	7.3		34.7	10.3	
Queue Delay	0.0		0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay	34.7		0.7		0.0		35.7	7.3		34.7	10.3	
LOS	C		A		A		D	A		C	B	
Approach Delay		19.5						9.2			10.6	
Approach LOS		B						A			B	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 71.3	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.45	
Intersection Signal Delay: 10.7	Intersection LOS: B
Intersection Capacity Utilization 55.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 19: Whitewood Rd & Linnel Ln/Lee Ln

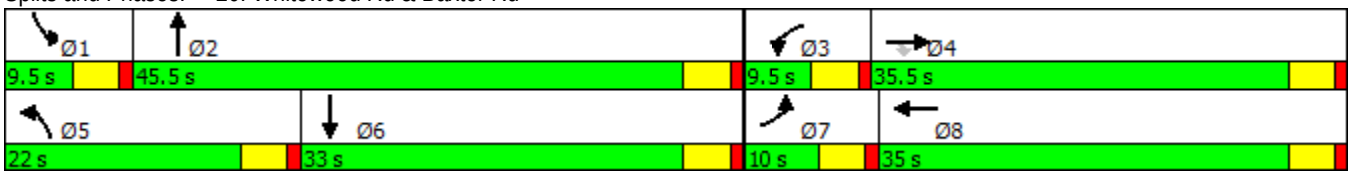


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	4	171	15	3	6	185	893	20	1	371	8
Future Volume (vph)	21	4	171	15	3	6	185	893	20	1	371	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	215		0	120		0	220		0	200		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.900			0.997			0.997	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	3185	0	1770	3529	0	1770	3529	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1863	1583	1770	3185	0	1770	3529	0	1770	3529	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			178		228			3			2	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2823			874			2884			792	
Travel Time (s)		64.2			19.9			65.5			18.0	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	22	4	178	16	3	6	193	930	21	1	386	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	4	178	16	9	0	193	951	0	1	394	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	35.5	35.5	9.5	34.9		9.5	32.1		9.5	32.1	
Total Split (s)	10.0	35.5	35.5	9.5	35.0		22.0	45.5		9.5	33.0	
Total Split (%)	10.0%	35.5%	35.5%	9.5%	35.0%		22.0%	45.5%		9.5%	33.0%	
Maximum Green (s)	5.5	31.0	31.0	5.0	30.5		17.5	41.0		5.0	28.5	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Max		None	Max	
Walk Time (s)		7.0	7.0		7.0			7.0			7.0	
Flash Dont Walk (s)		24.0	24.0		23.4			20.6			20.6	
Pedestrian Calls (#/hr)		0	0		0			0			0	
Act Effct Green (s)	5.6	6.9	6.9	5.1	6.9		12.2	44.3		5.1	29.0	
Actuated g/C Ratio	0.09	0.11	0.11	0.08	0.11		0.19	0.70		0.08	0.46	
v/c Ratio	0.14	0.02	0.54	0.11	0.02		0.57	0.39		0.01	0.24	
Control Delay	33.0	28.0	12.0	33.3	0.0		31.0	6.1		32.0	12.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	33.0	28.0	12.0	33.3	0.0		31.0	6.1		32.0	12.7	
LOS	C	C	B	C	A		C	A		C	B	
Approach Delay		14.6			21.3			10.3			12.8	
Approach LOS		B			C			B			B	

Intersection Summary	
Area Type: Other	
Cycle Length: 100	
Actuated Cycle Length: 63.4	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.57	
Intersection Signal Delay: 11.5	Intersection LOS: B
Intersection Capacity Utilization 48.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 20: Whitewood Rd & Baxter Rd



FUTURE YEAR 2035 WITHOUT PROJECT CONDITIONS

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	51	14	732	78	258	10	309	253	652	945	22
Future Volume (vph)	15	51	14	732	78	258	10	309	253	652	945	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		265	0		280	185		0
Storage Lanes	1		0	1		1	1		2	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	0.91	0.88	0.97	0.91	0.91
Frt		0.968				0.850			0.850		0.997	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	4923	0	1770	5085	1583	1770	5085	2787	3433	5070	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	4923	0	1770	5085	1583	1770	5085	2787	3433	5070	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15				280			275		2	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		687			1412			1630			2768	
Travel Time (s)		15.6			32.1			37.0			62.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	55	15	796	85	280	11	336	275	709	1027	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	70	0	796	85	280	11	336	275	709	1051	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		36			36			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			

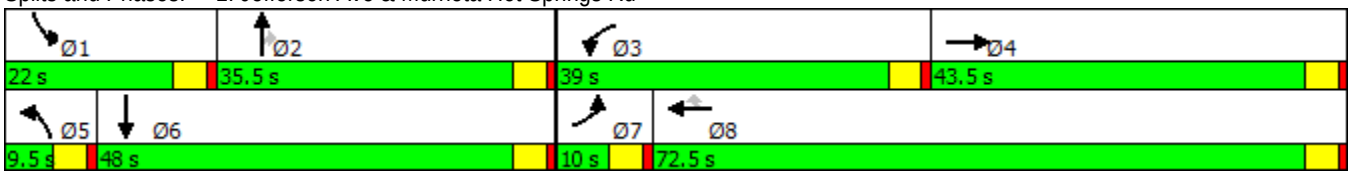
1: Jefferson Ave & Murrieta Hot Springs Rd

Timing Plan: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	43.5		9.5	44.4	44.4	9.5	33.8	33.8	9.5	22.5	
Total Split (s)	10.0	43.5		39.0	72.5	72.5	9.5	35.5	35.5	22.0	48.0	
Total Split (%)	7.1%	31.1%		27.9%	51.8%	51.8%	6.8%	25.4%	25.4%	15.7%	34.3%	
Maximum Green (s)	5.5	39.0		34.5	68.0	68.0	5.0	31.0	31.0	17.5	43.5	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0		7.0	7.0			
Flash Dont Walk (s)		32.0			32.9	32.9		22.3	22.3			
Pedestrian Calls (#/hr)		0			0	0		0	0			
Act Effct Green (s)	5.5	6.6		34.6	39.6	39.6	5.0	31.1	31.1	17.5	51.2	
Actuated g/C Ratio	0.05	0.06		0.33	0.38	0.38	0.05	0.29	0.29	0.17	0.48	
v/c Ratio	0.17	0.22		1.37	0.04	0.36	0.13	0.22	0.27	1.25	0.43	
Control Delay	53.8	40.6		210.5	22.3	4.6	53.3	29.3	4.3	162.7	19.3	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	53.8	40.6		210.5	22.3	4.6	53.3	29.3	4.3	162.7	19.3	
LOS	D	D		F	C	A	D	C	A	F	B	
Approach Delay		43.1			147.1			18.7			77.1	
Approach LOS		D			F			B			E	

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 105.6	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.37	
Intersection Signal Delay: 88.6	Intersection LOS: F
Intersection Capacity Utilization 83.0%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 1: Jefferson Ave & Murrieta Hot Springs Rd

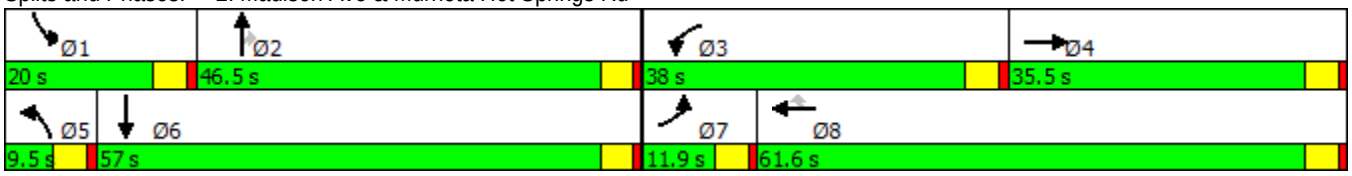


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	745	87	666	1075	282	36	223	297	282	593	355
Future Volume (vph)	77	745	87	666	1075	282	36	223	297	282	593	355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	250		0	100		100	165		0
Storage Lanes	2		0	2		1	2		2	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.86	0.86	0.97	0.91	1.00	0.97	0.95	0.88	0.97	0.95	0.95
Frt		0.984				0.850			0.850		0.944	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	6305	0	3433	5085	1583	3433	3539	2787	3433	3341	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	6305	0	3433	5085	1583	3433	3539	2787	3433	3341	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19				317			334		101	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1412			2198			1707			1381	
Travel Time (s)		32.1			50.0			38.8			31.4	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	87	837	98	748	1208	317	40	251	334	317	666	399
Shared Lane Traffic (%)												
Lane Group Flow (vph)	87	935	0	748	1208	317	40	251	334	317	1065	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	35.5		9.5	38.4	38.4	9.5	45.2	45.2	9.5	45.2	
Total Split (s)	11.9	35.5		38.0	61.6	61.6	9.5	46.5	46.5	20.0	57.0	
Total Split (%)	8.5%	25.4%		27.1%	44.0%	44.0%	6.8%	33.2%	33.2%	14.3%	40.7%	
Maximum Green (s)	7.4	31.0		33.5	57.1	57.1	5.0	42.0	42.0	15.5	52.5	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		24.0			26.9	26.9		33.7	33.7		33.7	
Pedestrian Calls (#/hr)		0			0	0		0	0		0	
Act Effct Green (s)	7.2	27.3		31.9	52.0	52.0	5.0	42.1	42.1	15.0	54.2	
Actuated g/C Ratio	0.05	0.20		0.24	0.39	0.39	0.04	0.31	0.31	0.11	0.40	
v/c Ratio	0.48	0.72		0.92	0.61	0.39	0.31	0.23	0.30	0.83	0.76	
Control Delay	72.2	52.6		67.3	34.5	4.2	71.9	35.8	4.3	77.4	36.5	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	72.2	52.6		67.3	34.5	4.2	71.9	35.8	4.3	77.4	36.5	
LOS	E	D		E	C	A	E	D	A	E	D	
Approach Delay		54.3			41.1			21.3			45.9	
Approach LOS		D			D			C			D	

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 134.4	
Natural Cycle: 125	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.92	
Intersection Signal Delay: 42.6	Intersection LOS: D
Intersection Capacity Utilization 78.2%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 2: Madison Ave & Murrieta Hot Springs Rd

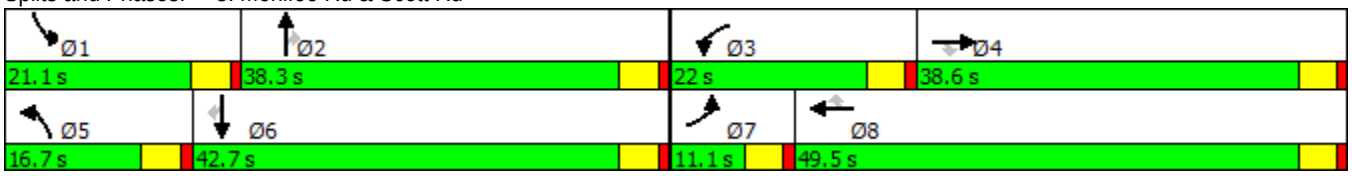


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	482	77	310	514	176	82	209	132	133	806	87
Future Volume (vph)	77	482	77	310	514	176	82	209	132	133	806	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	195		0	155		0	150		0
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	1770	3539	1583	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			136			178			136			136
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		804			428			403			545	
Travel Time (s)		18.3			9.7			9.2			12.4	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	78	487	78	313	519	178	83	211	133	134	814	88
Shared Lane Traffic (%)												
Lane Group Flow (vph)	78	487	78	313	519	178	83	211	133	134	814	88
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	38.6	38.6	9.5	9.5	9.5	9.5	9.5	9.5	9.5	36.6	36.6
Total Split (s)	11.1	38.6	38.6	22.0	49.5	49.5	16.7	38.3	38.3	21.1	42.7	42.7
Total Split (%)	9.3%	32.2%	32.2%	18.3%	41.3%	41.3%	13.9%	31.9%	31.9%	17.6%	35.6%	35.6%
Maximum Green (s)	6.6	34.1	34.1	17.5	45.0	45.0	12.2	33.8	33.8	16.6	38.2	38.2
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)		7.0	7.0								7.0	7.0
Flash Dont Walk (s)		27.1	27.1								25.1	25.1
Pedestrian Calls (#/hr)		0	0								0	0
Act Effct Green (s)	6.5	15.7	15.7	13.8	25.4	25.4	9.6	35.2	35.2	12.3	40.5	40.5
Actuated g/C Ratio	0.07	0.17	0.17	0.15	0.27	0.27	0.10	0.37	0.37	0.13	0.43	0.43
v/c Ratio	0.33	0.58	0.21	0.63	0.38	0.32	0.47	0.16	0.20	0.59	0.54	0.12
Control Delay	49.4	40.1	2.0	45.3	30.1	6.1	51.4	22.6	5.2	51.2	24.5	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.4	40.1	2.0	45.3	30.1	6.1	51.4	22.6	5.2	51.2	24.5	1.5
LOS	D	D	A	D	C	A	D	C	A	D	C	A
Approach Delay		36.6			30.6			22.8			26.0	
Approach LOS		D			C			C			C	

Intersection Summary	
Area Type: Other	
Cycle Length: 120	
Actuated Cycle Length: 95.1	
Natural Cycle: 95	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.63	
Intersection Signal Delay: 29.2	Intersection LOS: C
Intersection Capacity Utilization 60.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Menifee Rd & Scott Rd

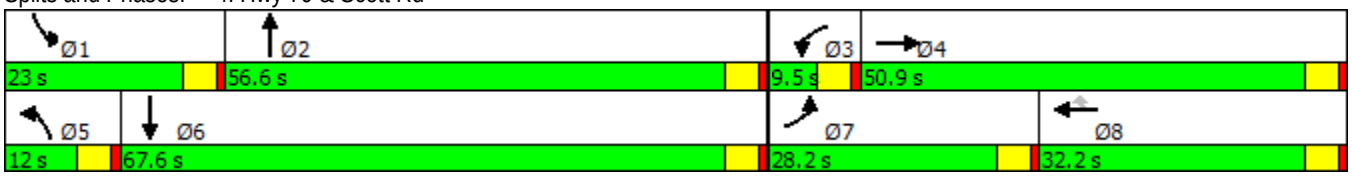


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	104	104	10	71	187	99	1248	10	264	2366	151
Future Volume (vph)	165	104	104	10	71	187	99	1248	10	264	2366	151
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	0.91	0.91	0.97	0.91	0.91
Frt		0.925				0.850		0.999			0.991	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	4704	0	1770	5085	1583	1770	5080	0	3433	5040	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	4704	0	1770	5085	1583	1770	5080	0	3433	5040	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		113				203		1			9	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1266			804			669			738	
Travel Time (s)		28.8			18.3			15.2			16.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	179	113	113	11	77	203	108	1357	11	287	2572	164
Shared Lane Traffic (%)												
Lane Group Flow (vph)	179	226	0	11	77	203	108	1368	0	287	2736	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Detector Phase	7	4		3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	9.5	50.9		9.5	9.5	9.5	9.5	41.9		9.5	49.8	
Total Split (s)	28.2	50.9		9.5	32.2	32.2	12.0	56.6		23.0	67.6	
Total Split (%)	20.1%	36.4%		6.8%	23.0%	23.0%	8.6%	40.4%		16.4%	48.3%	
Maximum Green (s)	23.7	46.4		5.0	27.7	27.7	7.5	52.1		18.5	63.1	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max		None	Max	
Walk Time (s)		7.0						7.0			7.0	
Flash Dont Walk (s)		39.4						30.4			38.3	
Pedestrian Calls (#/hr)		0						0			0	
Act Effct Green (s)	16.6	27.7		5.0	8.2	8.2	7.5	56.3		14.5	63.3	
Actuated g/C Ratio	0.15	0.24		0.04	0.07	0.07	0.07	0.49		0.13	0.56	
v/c Ratio	0.69	0.18		0.14	0.21	0.67	0.92	0.54		0.66	0.97	
Control Delay	60.9	17.0		59.9	51.8	18.7	119.6	22.3		55.3	37.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	60.9	17.0		59.9	51.8	18.7	119.6	22.3		55.3	37.4	
LOS	E	B		E	D	B	F	C		E	D	
Approach Delay		36.4			29.0			29.4			39.1	
Approach LOS		D			C			C			D	

Intersection Summary	
Area Type: Other	
Cycle Length: 140	
Actuated Cycle Length: 113.8	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.97	
Intersection Signal Delay: 35.6	Intersection LOS: D
Intersection Capacity Utilization 81.6%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 4: Hwy 79 & Scott Rd

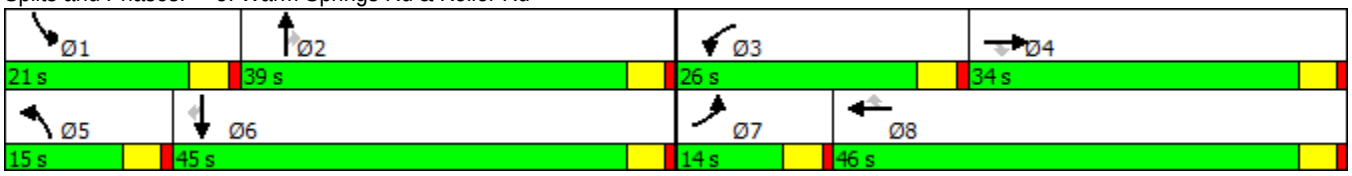


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	144	362	71	478	55	280	125	41	44	484	423
Future Volume (vph)	70	144	362	71	478	55	280	125	41	44	484	423
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	120		0	195		0	110		110	120		0
Storage Lanes	2		1	1		1	2		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	3433	3539	1583	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	1770	5085	1583	3433	3539	1583	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			385			136			177			286
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1361			4817			5440			744	
Travel Time (s)		30.9			109.5			123.6			16.9	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	74	153	385	76	509	59	298	133	44	47	515	450
Shared Lane Traffic (%)												
Lane Group Flow (vph)	74	153	385	76	509	59	298	133	44	47	515	450
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	29.2	29.2	9.5	26.9	26.9	9.5	30.9	30.9	9.5	29.2	29.2
Total Split (s)	14.0	34.0	34.0	26.0	46.0	46.0	15.0	39.0	39.0	21.0	45.0	45.0
Total Split (%)	11.7%	28.3%	28.3%	21.7%	38.3%	38.3%	12.5%	32.5%	32.5%	17.5%	37.5%	37.5%
Maximum Green (s)	9.5	29.5	29.5	21.5	41.5	41.5	10.5	34.5	34.5	16.5	40.5	40.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		17.7	17.7		15.4	15.4		19.4	19.4		17.7	17.7
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	7.4	13.9	13.9	9.3	15.7	15.7	10.6	48.3	48.3	7.9	40.9	40.9
Actuated g/C Ratio	0.08	0.15	0.15	0.10	0.17	0.17	0.12	0.53	0.53	0.09	0.45	0.45
v/c Ratio	0.26	0.20	0.68	0.42	0.58	0.15	0.74	0.07	0.05	0.31	0.32	0.52
Control Delay	43.5	34.9	10.5	46.9	37.2	0.8	52.6	14.5	0.1	46.0	18.0	9.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.5	34.9	10.5	46.9	37.2	0.8	52.6	14.5	0.1	46.0	18.0	9.5
LOS	D	C	B	D	D	A	D	B	A	D	B	A
Approach Delay		20.6			35.0			37.1			15.5	
Approach LOS		C			D			D			B	

Intersection Summary	
Area Type: Other	
Cycle Length: 120	
Actuated Cycle Length: 90.4	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 25.0	Intersection LOS: C
Intersection Capacity Utilization 54.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 5: Warm Springs Rd & Keller Rd

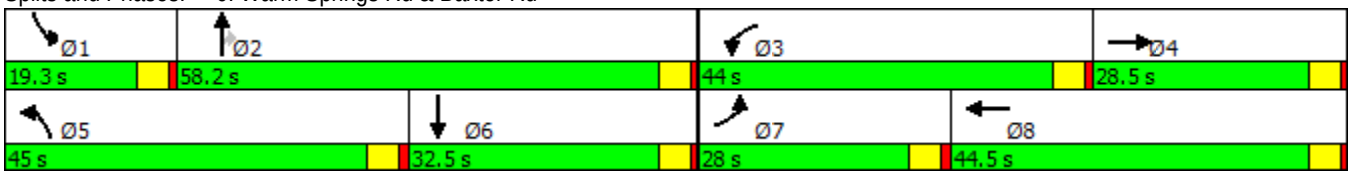


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	166	146	156	425	386	24	442	160	69	86	298	358
Future Volume (vph)	166	146	156	425	386	24	442	160	69	86	298	358
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		20	150		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.923			0.991				0.850		0.918	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3267	0	1770	3507	0	1770	3539	1583	1770	3249	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3267	0	1770	3507	0	1770	3539	1583	1770	3249	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		154			4				109		179	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		620			2823			806			5440	
Travel Time (s)		14.1			64.2			18.3			123.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	166	146	156	425	386	24	442	160	69	86	298	358
Shared Lane Traffic (%)												
Lane Group Flow (vph)	166	302	0	425	410	0	442	160	69	86	656	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	28.5		9.5	28.5		9.5	34.9	34.9	9.5	28.5	
Total Split (s)	28.0	28.5		44.0	44.5		45.0	58.2	58.2	19.3	32.5	
Total Split (%)	18.7%	19.0%		29.3%	29.7%		30.0%	38.8%	38.8%	12.9%	21.7%	
Maximum Green (s)	23.5	24.0		39.5	40.0		40.5	53.7	53.7	14.8	28.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0			7.0	7.0		7.0	
Flash Dont Walk (s)		17.0			17.0			17.0	17.0		17.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effct Green (s)	17.5	11.7		35.9	30.2		37.2	55.1	55.1	11.5	29.4	
Actuated g/C Ratio	0.13	0.09		0.27	0.23		0.28	0.42	0.42	0.09	0.22	
v/c Ratio	0.71	0.70		0.89	0.51		0.89	0.11	0.10	0.56	0.76	
Control Delay	73.1	38.2		67.8	47.3		67.0	26.0	1.3	74.2	42.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	73.1	38.2		67.8	47.3		67.0	26.0	1.3	74.2	42.8	
LOS	E	D		E	D		E	C	A	E	D	
Approach Delay		50.6			57.8			50.5			46.5	
Approach LOS		D			E			D			D	

Intersection Summary	
Area Type: Other	
Cycle Length: 150	
Actuated Cycle Length: 132.3	
Natural Cycle: 125	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 51.6	Intersection LOS: D
Intersection Capacity Utilization 91.8%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 6: Warm Springs Rd & Baxter Rd

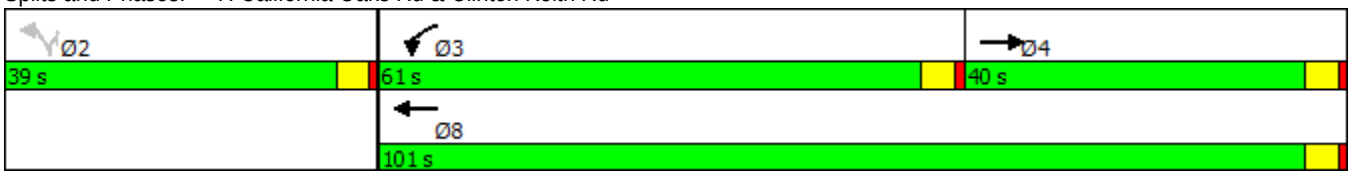


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	987	190	627	940	143	473
Future Volume (vph)	987	190	627	940	143	473
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	225		100	0
Storage Lanes		0	1		1	2
Taper Length (ft)			25		25	
Lane Util. Factor	0.91	0.91	1.00	0.91	1.00	0.88
Frt	0.976					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	4963	0	1770	5085	1770	2787
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	4963	0	1770	5085	1770	2787
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	27					498
Link Speed (mph)	30			30	30	
Link Distance (ft)	2233			3569	625	
Travel Time (s)	50.8			81.1	14.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1039	200	660	989	151	498
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1239	0	660	989	151	498
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Number of Detectors	2		1	2	1	1
Detector Template	Thru		Left	Thru	Left	Right
Leading Detector (ft)	100		20	100	20	20
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	6		20	6	20	20
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Prot	NA	Perm	Perm
Protected Phases	4		3	8		
Permitted Phases					2	2

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	4		3	8	2	2
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0
Minimum Split (s)	36.6		9.5	9.5	37.2	37.2
Total Split (s)	40.0		61.0	101.0	39.0	39.0
Total Split (%)	28.6%		43.6%	72.1%	27.9%	27.9%
Maximum Green (s)	35.5		56.5	96.5	34.5	34.5
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5		4.5	4.5	4.5	4.5
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	None	Max	Max
Walk Time (s)	7.0				7.0	7.0
Flash Dont Walk (s)	25.1				25.7	25.7
Pedestrian Calls (#/hr)	0				0	0
Act Effct Green (s)	35.6		53.2	93.2	34.6	34.6
Actuated g/C Ratio	0.26		0.39	0.68	0.25	0.25
v/c Ratio	0.95		0.96	0.29	0.34	0.46
Control Delay	63.8		66.6	8.8	45.3	4.9
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	63.8		66.6	8.8	45.3	4.9
LOS	E		E	A	D	A
Approach Delay	63.8			31.9	14.3	
Approach LOS	E			C	B	

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 136.8	
Natural Cycle: 125	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 39.9	Intersection LOS: D
Intersection Capacity Utilization 77.2%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 7: California Oaks Rd & Clinton Keith Rd

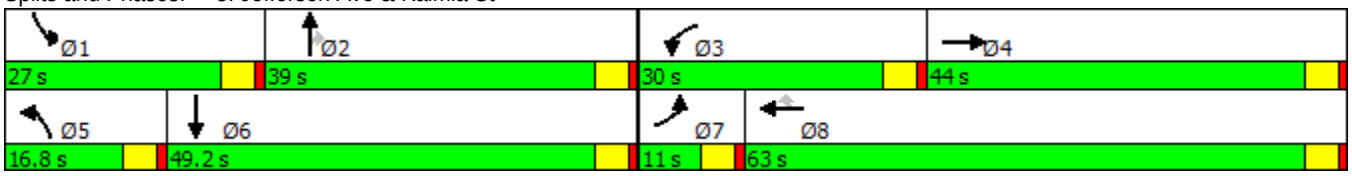


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	759	302	332	627	209	154	366	136	290	918	49
Future Volume (vph)	26	759	302	332	627	209	154	366	136	290	918	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		140	235		0	205		0	145		0
Storage Lanes	1		0	1		1	2		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.95	1.00	0.97	0.91	1.00	1.00	0.91	0.91
Frt		0.957				0.850			0.850		0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	4867	0	1770	3539	1583	3433	5085	1583	1770	5045	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	4867	0	1770	3539	1583	3433	5085	1583	1770	5045	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		72				230			152		6	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1399			684			2782			1004	
Travel Time (s)		31.8			15.5			63.2			22.8	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	29	834	332	365	689	230	169	402	149	319	1009	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	1166	0	365	689	230	169	402	149	319	1063	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	44.0		9.5	34.9	34.9	9.5	38.6	38.6	9.5	39.5	
Total Split (s)	11.0	44.0		30.0	63.0	63.0	16.8	39.0	39.0	27.0	49.2	
Total Split (%)	7.9%	31.4%		21.4%	45.0%	45.0%	12.0%	27.9%	27.9%	19.3%	35.1%	
Maximum Green (s)	6.5	39.5		25.5	58.5	58.5	12.3	34.5	34.5	22.5	44.7	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		32.5			23.4	23.4		27.1	27.1		28.0	
Pedestrian Calls (#/hr)		0			0	0		0	0		0	
Act Effct Green (s)	6.3	37.7		25.5	61.2	61.2	11.2	34.5	34.5	22.5	45.8	
Actuated g/C Ratio	0.05	0.27		0.18	0.44	0.44	0.08	0.25	0.25	0.16	0.33	
v/c Ratio	0.36	0.85		1.12	0.44	0.28	0.61	0.32	0.29	1.11	0.63	
Control Delay	77.4	51.2		136.4	28.5	3.9	71.3	43.4	7.3	137.5	41.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	77.4	51.2		136.4	28.5	3.9	71.3	43.4	7.3	137.5	41.4	
LOS	E	D		F	C	A	E	D	A	F	D	
Approach Delay		51.8			54.7			42.5			63.6	
Approach LOS		D			D			D			E	

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 138.2	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.12	
Intersection Signal Delay: 54.7	Intersection LOS: D
Intersection Capacity Utilization 78.0%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 8: Jefferson Ave & Kalmia St

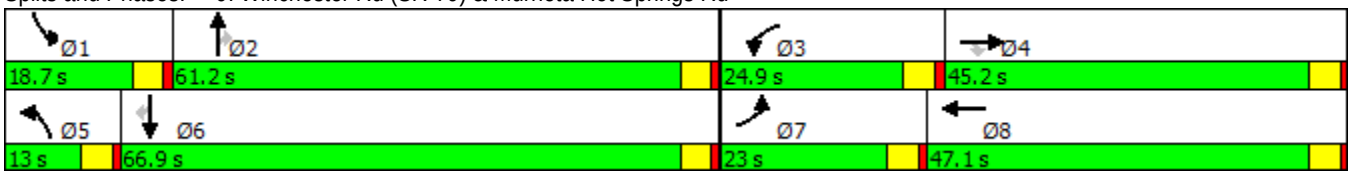


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	679	575	121	297	870	201	249	936	148	187	1767	1076
Future Volume (vph)	679	575	121	297	870	201	249	936	148	187	1767	1076
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	195		200	195		200	205		0	210		0
Storage Lanes	2		1	2		0	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	0.91	0.97	0.91	1.00	0.97	0.91	1.00
Frt			0.850		0.972				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	3433	4943	0	3433	5085	1583	3433	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	4943	0	3433	5085	1583	3433	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			122		35				153			307
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1422			1339			680			585	
Travel Time (s)		32.3			30.4			15.5			13.3	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	700	593	125	306	897	207	257	965	153	193	1822	1109
Shared Lane Traffic (%)												
Lane Group Flow (vph)	700	593	125	306	1104	0	257	965	153	193	1822	1109
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4						2			6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	9.5	9.5	9.5	47.1		9.5	44.4	44.4	9.5	44.9	44.9
Total Split (s)	23.0	45.2	45.2	24.9	47.1		13.0	61.2	61.2	18.7	66.9	66.9
Total Split (%)	15.3%	30.1%	30.1%	16.6%	31.4%		8.7%	40.8%	40.8%	12.5%	44.6%	44.6%
Maximum Green (s)	18.5	40.7	40.7	20.4	42.6		8.5	56.7	56.7	14.2	62.4	62.4
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	Max	Max	None	Max	Max
Walk Time (s)					7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)					35.6			32.9	32.9		33.4	33.4
Pedestrian Calls (#/hr)					0			0	0		0	0
Act Effct Green (s)	18.5	40.3	40.3	17.7	39.5		8.5	58.2	58.2	12.7	62.4	62.4
Actuated g/C Ratio	0.13	0.27	0.27	0.12	0.27		0.06	0.40	0.40	0.09	0.42	0.42
v/c Ratio	1.62	0.43	0.24	0.74	0.81		1.30	0.48	0.21	0.65	0.84	1.31
Control Delay	328.9	45.2	8.3	73.9	54.2		217.0	34.7	5.1	76.0	42.9	173.4
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	328.9	45.2	8.3	73.9	54.2		217.0	34.7	5.1	76.0	42.9	173.4
LOS	F	D	A	E	D		F	C	A	E	D	F
Approach Delay		182.0			58.5			65.5			91.2	
Approach LOS		F			E			E			F	

Intersection Summary	
Area Type:	Other
Cycle Length: 150	
Actuated Cycle Length: 147	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.62	
Intersection Signal Delay: 97.7	Intersection LOS: F
Intersection Capacity Utilization 106.3%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 9: Winchester Rd (SR-79) & Murrieta Hot Springs Rd

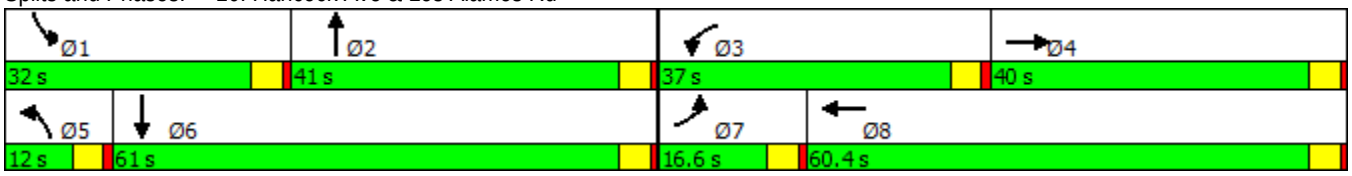


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	126	819	82	514	1034	214	93	115	139	568	557	209
Future Volume (vph)	126	819	82	514	1034	214	93	115	139	568	557	209
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	100		0	100		0	225		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	0.97	1.00	1.00
Frt		0.986			0.974			0.918			0.959	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3490	0	1770	3447	0	1770	3249	0	3433	1786	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3490	0	1770	3447	0	1770	3249	0	3433	1786	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			19			151			14	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		440			1059			599			686	
Travel Time (s)		10.0			24.1			13.6			15.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	137	890	89	559	1124	233	101	125	151	617	605	227
Shared Lane Traffic (%)												
Lane Group Flow (vph)	137	979	0	559	1357	0	101	276	0	617	832	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	36.4		9.5	36.4		9.5	36.9		9.5	36.4	
Total Split (s)	16.6	40.0		37.0	60.4		12.0	41.0		32.0	61.0	
Total Split (%)	11.1%	26.7%		24.7%	40.3%		8.0%	27.3%		21.3%	40.7%	
Maximum Green (s)	12.1	35.5		32.5	55.9		7.5	36.5		27.5	56.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Max		None	Max	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		24.9			24.9			25.4			24.9	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	12.1	35.5		32.5	55.9		7.5	36.5		27.5	56.5	
Actuated g/C Ratio	0.08	0.24		0.22	0.37		0.05	0.24		0.18	0.38	
v/c Ratio	0.96	1.18		1.46	1.05		1.15	0.31		0.98	1.22	
Control Delay	133.8	141.0		261.3	82.8		200.6	21.4		91.8	152.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	133.8	141.0		261.3	82.8		200.6	21.4		91.8	152.2	
LOS	F	F		F	F		F	C		F	F	
Approach Delay		140.1			134.9			69.4			126.5	
Approach LOS		F			F			E			F	

Intersection Summary	
Area Type: Other	
Cycle Length: 150	
Actuated Cycle Length: 150	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.46	
Intersection Signal Delay: 128.5	Intersection LOS: F
Intersection Capacity Utilization 115.9%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 10: Hancock Ave & Los Alamos Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1117	396	277	1006	0	0	0	0	159	0	785
Future Volume (vph)	0	1117	396	277	1006	0	0	0	0	159	0	785
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		95	100		0	0		0	305		305
Storage Lanes	0		1	2		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	0.95	0.91	0.95
Frt			0.850								0.856	0.850
Flt Protected				0.950						0.950	0.998	
Satd. Flow (prot)	0	3539	1583	3433	3539	0	0	0	0	1681	1448	1504
Flt Permitted				0.950						0.950	0.998	
Satd. Flow (perm)	0	3539	1583	3433	3539	0	0	0	0	1681	1448	1504
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			192								95	95
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1059			394			642			451	
Travel Time (s)		24.1			9.0			14.6			10.3	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	1152	408	286	1037	0	0	0	0	164	0	809
Shared Lane Traffic (%)										10%		49%
Lane Group Flow (vph)	0	1152	408	286	1037	0	0	0	0	148	412	413
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2	1	1	2					1	2	1
Detector Template		Thru	Right	Left	Thru					Left	Thru	Right
Leading Detector (ft)		100	20	20	100					20	100	20
Trailing Detector (ft)		0	0	0	0					0	0	0
Detector 1 Position(ft)		0	0	0	0					0	0	0
Detector 1 Size(ft)		6	20	20	6					20	6	20
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Detector 2 Position(ft)		94			94						94	
Detector 2 Size(ft)		6			6						6	
Detector 2 Type		Cl+Ex			Cl+Ex						Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0						0.0	
Turn Type		NA	Perm	Prot	NA					Prot	NA	Perm
Protected Phases		4		3	8					1	6	
Permitted Phases			4									6

11: I-215 SB On-Ramp/I-215 SB Off-Ramp & Los Alamos Rd

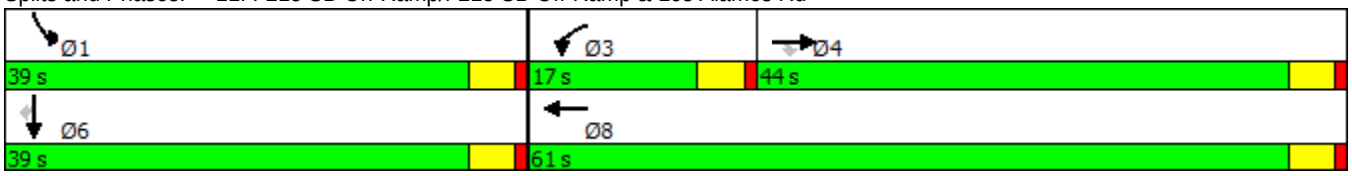
Timing Plan: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		4	4	3	8					1	6	6
Switch Phase												
Minimum Initial (s)		5.0	5.0	5.0	5.0					5.0	5.0	5.0
Minimum Split (s)		34.6	34.6	9.5	28.4					9.5	9.5	9.5
Total Split (s)		44.0	44.0	17.0	61.0					39.0	39.0	39.0
Total Split (%)		44.0%	44.0%	17.0%	61.0%					39.0%	39.0%	39.0%
Maximum Green (s)		39.5	39.5	12.5	56.5					34.5	34.5	34.5
Yellow Time (s)		3.5	3.5	3.5	3.5					3.5	3.5	3.5
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Lost Time (s)		4.5	4.5	4.5	4.5					4.5	4.5	4.5
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		None	None	None	None					None	Max	Max
Walk Time (s)		7.0	7.0		7.0							
Flash Dont Walk (s)		23.1	23.1		16.9							
Pedestrian Calls (#/hr)		0	0		0							
Act Effct Green (s)		37.9	37.9	11.8	54.2					34.6	34.6	34.6
Actuated g/C Ratio		0.39	0.39	0.12	0.55					0.35	0.35	0.35
v/c Ratio		0.84	0.56	0.69	0.53					0.25	0.72	0.70
Control Delay		33.9	15.1	51.1	14.8					24.6	29.7	28.4
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Delay		33.9	15.1	51.1	14.8					24.6	29.7	28.4
LOS		C	B	D	B					C	C	C
Approach Delay		29.0			22.7						28.4	
Approach LOS		C			C						C	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 97.8
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 26.7 Intersection LOS: C
Intersection Capacity Utilization 67.7% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 11: I-215 SB On-Ramp/I-215 SB Off-Ramp & Los Alamos Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	1341	33	183	1743	269	38	66	49	462	247	154
Future Volume (vph)	35	1341	33	183	1743	269	38	66	49	462	247	154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	215		0	150		0	150		0	225		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.996			0.980				0.850		0.942	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	5065	0	1770	4984	0	1770	3539	1583	1770	3334	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	5065	0	1770	4984	0	1770	3539	1583	1770	3334	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			22				142		111	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		764			996			580			564	
Travel Time (s)		17.4			22.6			13.2			12.8	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	37	1427	35	195	1854	286	40	70	52	491	263	164
Shared Lane Traffic (%)												
Lane Group Flow (vph)	37	1462	0	195	2140	0	40	70	52	491	427	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			

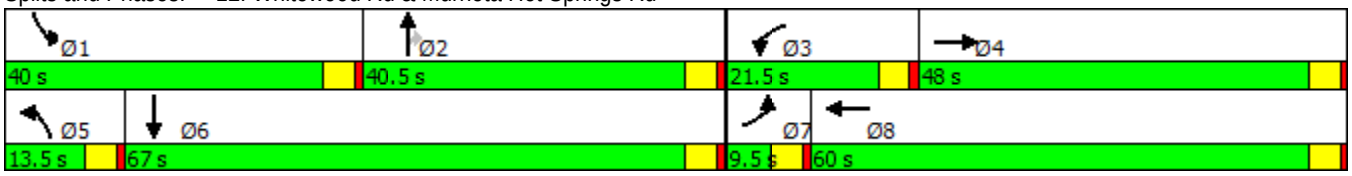
12: Whitewood Rd & Murrieta Hot Springs Rd

Timing Plan: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	26.6		9.5	32.6		9.5	38.6	38.6	9.5	38.9	
Total Split (s)	9.5	48.0		21.5	60.0		13.5	40.5	40.5	40.0	67.0	
Total Split (%)	6.3%	32.0%		14.3%	40.0%		9.0%	27.0%	27.0%	26.7%	44.7%	
Maximum Green (s)	5.0	43.5		17.0	55.5		9.0	36.0	36.0	35.5	62.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0			7.0	7.0		7.0	
Flash Dont Walk (s)		15.1			21.1			27.1	27.1		27.4	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effct Green (s)	5.0	43.5		17.0	57.4		7.9	36.0	36.0	35.5	65.6	
Actuated g/C Ratio	0.03	0.29		0.11	0.38		0.05	0.24	0.24	0.24	0.44	
v/c Ratio	0.63	0.99		0.97	1.11		0.43	0.08	0.11	1.17	0.28	
Control Delay	112.2	74.8		122.4	101.5		82.5	44.6	0.4	149.9	20.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	112.2	74.8		122.4	101.5		82.5	44.6	0.4	149.9	20.8	
LOS	F	E		F	F		F	D	A	F	C	
Approach Delay		75.7			103.3			39.8			89.8	
Approach LOS		E			F			D			F	

Intersection Summary	
Area Type:	Other
Cycle Length: 150	
Actuated Cycle Length: 150	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.17	
Intersection Signal Delay: 90.3	Intersection LOS: F
Intersection Capacity Utilization 87.3%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 12: Whitewood Rd & Murrieta Hot Springs Rd

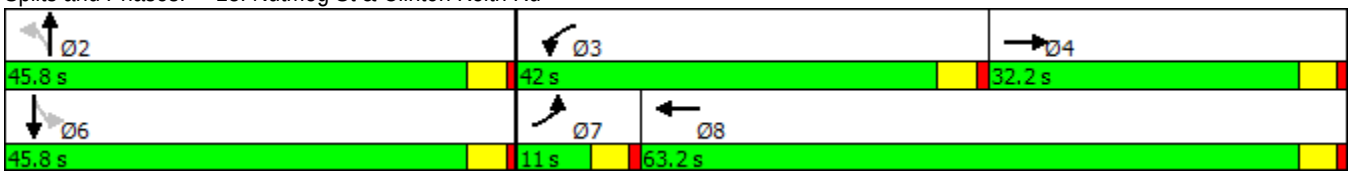


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	609	96	341	620	99	115	44	357	141	66	77
Future Volume (vph)	30	609	96	341	620	99	115	44	357	141	66	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	225		0	180		0	50		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.980			0.979			0.867			0.919	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	4984	0	1770	4979	0	1770	3068	0	1770	3253	0
Flt Permitted	0.950			0.950			0.656			0.448		
Satd. Flow (perm)	1770	4984	0	1770	4979	0	1222	3068	0	835	3253	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		23			35			380			82	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		471			2233			1168			1110	
Travel Time (s)		10.7			50.8			26.5			25.2	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	32	648	102	363	660	105	122	47	380	150	70	82
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	750	0	363	765	0	122	427	0	150	152	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	32.1		9.5	9.5		38.6	38.6		9.5	9.5	
Total Split (s)	11.0	32.2		42.0	63.2		45.8	45.8		45.8	45.8	
Total Split (%)	9.2%	26.8%		35.0%	52.7%		38.2%	38.2%		38.2%	38.2%	
Maximum Green (s)	6.5	27.7		37.5	58.7		41.3	41.3		41.3	41.3	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)		7.0					7.0	7.0				
Flash Dont Walk (s)		20.6					27.1	27.1				
Pedestrian Calls (#/hr)		0					0	0				
Act Effct Green (s)	6.3	21.9		26.3	46.6		41.8	41.8		41.8	41.8	
Actuated g/C Ratio	0.06	0.21		0.25	0.45		0.40	0.40		0.40	0.40	
v/c Ratio	0.30	0.70		0.81	0.34		0.25	0.29		0.45	0.11	
Control Delay	58.6	41.0		51.3	18.2		25.6	4.7		31.4	11.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	58.6	41.0		51.3	18.2		25.6	4.7		31.4	11.7	
LOS	E	D		D	B		C	A		C	B	
Approach Delay		41.8			28.9			9.3			21.4	
Approach LOS		D			C			A			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 103.7	
Natural Cycle: 95	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.81	
Intersection Signal Delay: 27.8	Intersection LOS: C
Intersection Capacity Utilization 68.4%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 13: Nutmeg St & Clinton Keith Rd



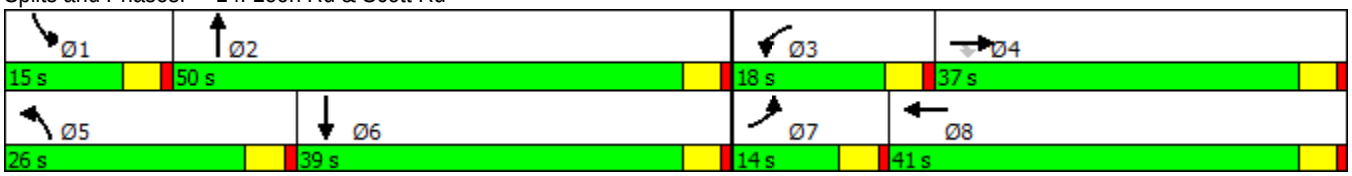
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	286	203	43	313	14	220	60	23	27	99	10
Future Volume (vph)	17	286	203	43	313	14	220	60	23	27	99	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.97	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.994			0.959			0.986	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	5085	1583	1770	5055	0	3433	3394	0	1770	3490	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	5085	1583	1770	5055	0	3433	3394	0	1770	3490	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			216		6			24			9	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		966			752			675			676	
Travel Time (s)		22.0			17.1			15.3			15.4	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	18	304	216	46	333	15	234	64	24	29	105	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	18	304	216	46	348	0	234	88	0	29	116	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									
Detector Phase	7	4	4	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	9.5	28.5	28.5	9.5	28.5		9.5	33.5		9.5	33.5	
Total Split (s)	14.0	37.0	37.0	18.0	41.0		26.0	50.0		15.0	39.0	
Total Split (%)	11.7%	30.8%	30.8%	15.0%	34.2%		21.7%	41.7%		12.5%	32.5%	
Maximum Green (s)	9.5	32.5	32.5	13.5	36.5		21.5	45.5		10.5	34.5	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Walk Time (s)		7.0	7.0		7.0			7.0			7.0	
Flash Dont Walk (s)		17.0	17.0		17.0			22.0			22.0	
Pedestrian Calls (#/hr)		0	0		0			0			0	
Act Effct Green (s)	6.4	9.6	9.6	7.2	11.9		9.3	17.8		6.7	7.4	
Actuated g/C Ratio	0.14	0.22	0.22	0.16	0.27		0.21	0.40		0.15	0.17	
v/c Ratio	0.07	0.28	0.42	0.16	0.26		0.33	0.06		0.11	0.20	
Control Delay	22.3	17.1	6.6	21.5	13.9		18.6	12.2		22.0	19.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.3	17.1	6.6	21.5	13.9		18.6	12.2		22.0	19.0	
LOS	C	B	A	C	B		B	B		C	B	
Approach Delay		13.1			14.8			16.9			19.6	
Approach LOS		B			B			B			B	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 44.6
Natural Cycle: 85
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.42
Intersection Signal Delay: 15.1 — Intersection LOS: B
Intersection Capacity Utilization 34.7% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 14: Leon Rd & Scott Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	1575	209	176	1276	13	55	5	192	18	38	27
Future Volume (vph)	11	1575	209	176	1276	13	55	5	192	18	38	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		210	0		0	200		200
Storage Lanes	1		0	1		1	1		0	1		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Frt		0.982				0.850		0.854				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	4994	0	1770	5085	1583	1770	1591	0	1770	1863	2787
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	4994	0	1770	5085	1583	1770	1591	0	1770	1863	2787
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19				76		200				109
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1884			2845			958			1018	
Travel Time (s)		42.8			64.7			21.8			23.1	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	11	1641	218	183	1329	14	57	5	200	19	40	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	1859	0	183	1329	14	57	205	0	19	40	28
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						6

15: Murrieta Oaks Ave/Mitchell Rd & Clinton Keith Rd

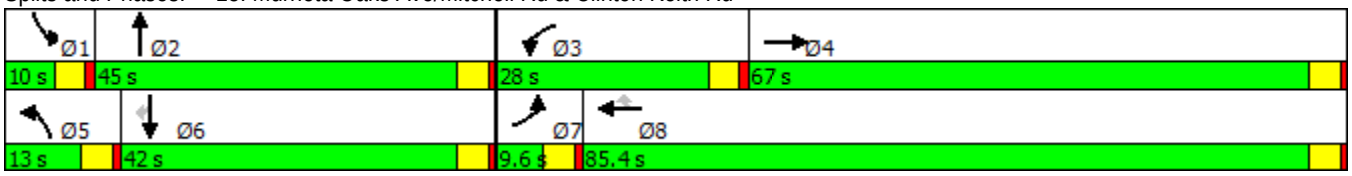
Timing Plan: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	26.1		9.5	35.5	35.5	9.5	41.5		9.5	38.4	38.4
Total Split (s)	9.6	67.0		28.0	85.4	85.4	13.0	45.0		10.0	42.0	42.0
Total Split (%)	6.4%	44.7%		18.7%	56.9%	56.9%	8.7%	30.0%		6.7%	28.0%	28.0%
Maximum Green (s)	5.1	62.5		23.5	80.9	80.9	8.5	40.5		5.5	37.5	37.5
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	Max		None	Max	Max
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		14.6			24.0	24.0		30.0			26.9	26.9
Pedestrian Calls (#/hr)		0			0	0		0			0	0
Act Effct Green (s)	5.1	60.5		19.2	80.6	80.6	8.0	42.8		5.5	38.5	38.5
Actuated g/C Ratio	0.04	0.43		0.14	0.57	0.57	0.06	0.30		0.04	0.27	0.27
v/c Ratio	0.17	0.87		0.77	0.46	0.02	0.57	0.33		0.28	0.08	0.03
Control Delay	76.4	42.6		81.0	19.1	0.0	90.3	7.4		80.1	43.2	0.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	76.4	42.6		81.0	19.1	0.0	90.3	7.4		80.1	43.2	0.1
LOS	E	D		F	B	A	F	A		F	D	A
Approach Delay		42.8			26.4			25.4			37.4	
Approach LOS		D			C			C			D	

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 141.8
Natural Cycle: 110
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.87
Intersection Signal Delay: 34.8 Intersection LOS: C
Intersection Capacity Utilization 71.0% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 15: Murrieta Oaks Ave/Mitchell Rd & Clinton Keith Rd

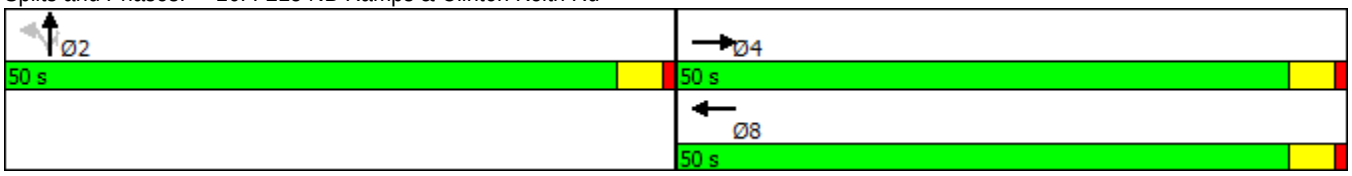


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1676	759	0	1678	291	359	0	582	0	0	0
Future Volume (vph)	0	1676	759	0	1678	291	359	0	582	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		160	0		0	0		0	0		0
Storage Lanes	0		1	0		1	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Frt			0.850			0.850		0.961	0.850			
Flt Protected								0.964				
Satd. Flow (prot)	0	5085	1583	0	5085	1583	0	1639	1504	0	0	0
Flt Permitted								0.964				
Satd. Flow (perm)	0	5085	1583	0	5085	1583	0	1639	1504	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			329			188		16	16			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2845			3447			1631			722	
Travel Time (s)		64.7			78.3			37.1			16.4	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	0	2019	914	0	2022	351	433	0	701	0	0	0
Shared Lane Traffic (%)									22%			
Lane Group Flow (vph)	0	2019	914	0	2022	351	0	587	547	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2	1		2	1	1	2	1			
Detector Template		Thru	Right		Thru	Right	Left	Thru	Right			
Leading Detector (ft)		100	20		100	20	20	100	20			
Trailing Detector (ft)		0	0		0	0	0	0	0			
Detector 1 Position(ft)		0	0		0	0	0	0	0			
Detector 1 Size(ft)		6	20		6	20	20	6	20			
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0			
Detector 1 Queue (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0			
Detector 1 Delay (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0			
Detector 2 Position(ft)		94			94			94				
Detector 2 Size(ft)		6			6			6				
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				
Turn Type		NA	Free		NA	Free	Perm	NA	Perm			
Protected Phases		4			8			2				
Permitted Phases			Free			Free	2		2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		4			8		2	2	2			
Switch Phase												
Minimum Initial (s)		5.0			5.0		5.0	5.0	5.0			
Minimum Split (s)		43.5			9.5		9.5	9.5	9.5			
Total Split (s)		50.0			50.0		50.0	50.0	50.0			
Total Split (%)		50.0%			50.0%		50.0%	50.0%	50.0%			
Maximum Green (s)		45.5			45.5		45.5	45.5	45.5			
Yellow Time (s)		3.5			3.5		3.5	3.5	3.5			
All-Red Time (s)		1.0			1.0		1.0	1.0	1.0			
Lost Time Adjust (s)		0.0			0.0			0.0	0.0			
Total Lost Time (s)		4.5			4.5			4.5	4.5			
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0			
Recall Mode		None			None		Max	Max	Max			
Walk Time (s)		7.0										
Flash Dont Walk (s)		32.0										
Pedestrian Calls (#/hr)		0										
Act Effct Green (s)		45.5	100.0		45.5	100.0		45.5	45.5			
Actuated g/C Ratio		0.46	1.00		0.46	1.00		0.46	0.46			
v/c Ratio		0.87	0.58		0.87	0.22		0.78	0.79			
Control Delay		30.0	1.5		30.0	0.3		31.1	32.5			
Queue Delay		0.0	0.0		0.0	0.0		0.0	0.0			
Total Delay		30.0	1.5		30.0	0.3		31.1	32.5			
LOS		C	A		C	A		C	C			
Approach Delay		21.1			25.6			31.7				
Approach LOS		C			C			C				

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 24.6	Intersection LOS: C
Intersection Capacity Utilization 71.7%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 16: I-215 NB Ramps & Clinton Keith Rd

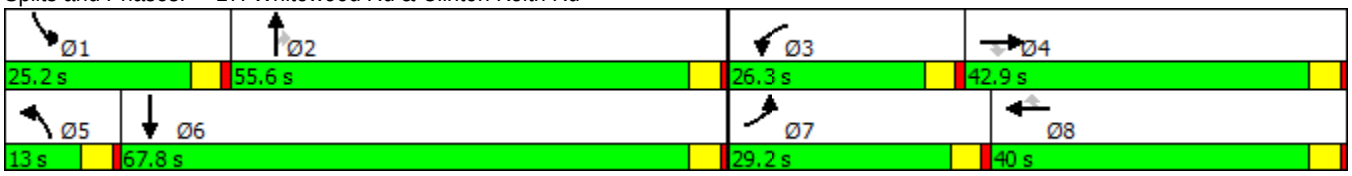


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	287	655	187	286	968	344	132	104	192	269	799	339
Future Volume (vph)	287	655	187	286	968	344	132	104	192	269	799	339
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	260		0	200		150	310		0	100		0
Storage Lanes	2		1	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	0.95
Frt			0.850			0.850			0.850		0.955	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3380	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3380	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			154			214			223		54	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3447			4370			3330			2871	
Travel Time (s)		78.3			99.3			75.7			65.3	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	334	762	217	333	1126	400	153	121	223	313	929	394
Shared Lane Traffic (%)												
Lane Group Flow (vph)	334	762	217	333	1126	400	153	121	223	313	1323	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	29.2	29.2	29.2	9.5	9.5	9.5	9.5	46.4	46.4	9.5	43.5	
Total Split (s)	29.2	42.9	42.9	26.3	40.0	40.0	13.0	55.6	55.6	25.2	67.8	
Total Split (%)	19.5%	28.6%	28.6%	17.5%	26.7%	26.7%	8.7%	37.1%	37.1%	16.8%	45.2%	
Maximum Green (s)	24.7	38.4	38.4	21.8	35.5	35.5	8.5	51.1	51.1	20.7	63.3	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	
Walk Time (s)	7.0	7.0	7.0					7.0	7.0		7.0	
Flash Dont Walk (s)	17.7	17.7	17.7					34.9	34.9		32.0	
Pedestrian Calls (#/hr)	0	0	0					0	0		0	
Act Effct Green (s)	19.2	36.2	36.2	18.6	35.5	35.5	8.5	54.0	54.0	17.8	63.3	
Actuated g/C Ratio	0.13	0.25	0.25	0.13	0.25	0.25	0.06	0.37	0.37	0.12	0.44	
v/c Ratio	0.73	0.60	0.42	0.76	0.90	0.73	0.76	0.09	0.31	0.74	0.88	
Control Delay	70.1	50.4	16.9	72.4	63.8	31.7	90.7	31.2	5.2	72.5	43.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	70.1	50.4	16.9	72.4	63.8	31.7	90.7	31.2	5.2	72.5	43.6	
LOS	E	D	B	E	E	C	F	C	A	E	D	
Approach Delay		49.9			58.4			37.8			49.1	
Approach LOS		D			E			D			D	

Intersection Summary	
Area Type:	Other
Cycle Length: 150	
Actuated Cycle Length: 144.6	
Natural Cycle: 125	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 51.5	Intersection LOS: D
Intersection Capacity Utilization 79.0%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 17: Whitewood Rd & Clinton Keith Rd

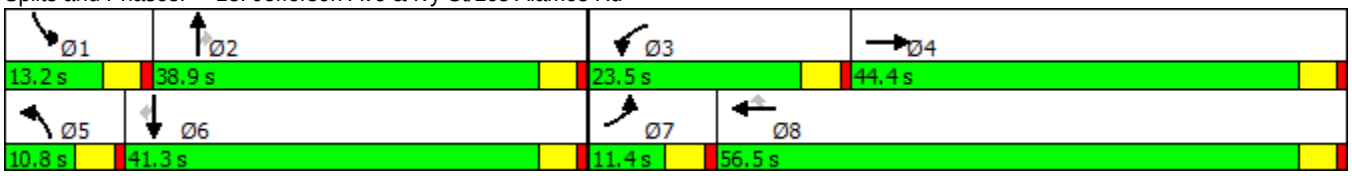


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	159	132	258	209	181	113	435	74	212	1168	49
Future Volume (vph)	38	159	132	258	209	181	113	435	74	212	1168	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		0	205		0	230		215	250		220
Storage Lanes	1		0	1		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt		0.932				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3299	0	1770	3539	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3299	0	1770	3539	1583	3433	5085	1583	3433	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		136				187			136			136
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1401			1395			2768			2782	
Travel Time (s)		31.8			31.7			62.9			63.2	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	39	164	136	266	215	187	116	448	76	219	1204	51
Shared Lane Traffic (%)												
Lane Group Flow (vph)	39	300	0	266	215	187	116	448	76	219	1204	51
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	44.4		9.5	44.4	44.4	9.5	38.4	38.4	9.5	34.4	34.4
Total Split (s)	11.4	44.4		23.5	56.5	56.5	10.8	38.9	38.9	13.2	41.3	41.3
Total Split (%)	9.5%	37.0%		19.6%	47.1%	47.1%	9.0%	32.4%	32.4%	11.0%	34.4%	34.4%
Maximum Green (s)	6.9	39.9		19.0	52.0	52.0	6.3	34.4	34.4	8.7	36.8	36.8
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		32.9			32.9	32.9		26.9	26.9		22.9	22.9
Pedestrian Calls (#/hr)		0			0	0		0	0		0	0
Act Effct Green (s)	6.5	10.0		18.5	26.3	26.3	6.3	34.4	34.4	8.7	36.8	36.8
Actuated g/C Ratio	0.07	0.11		0.21	0.29	0.29	0.07	0.38	0.38	0.10	0.41	0.41
v/c Ratio	0.30	0.62		0.73	0.21	0.31	0.48	0.23	0.11	0.66	0.58	0.07
Control Delay	46.9	26.2		46.9	25.7	5.8	48.0	19.5	0.8	50.0	22.1	0.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.9	26.2		46.9	25.7	5.8	48.0	19.5	0.8	50.0	22.1	0.2
LOS	D	C		D	C	A	D	B	A	D	C	A
Approach Delay		28.6			28.6			22.4			25.5	
Approach LOS		C			C			C			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 89.6	
Natural Cycle: 115	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 25.9	Intersection LOS: C
Intersection Capacity Utilization 64.7%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 18: Jefferson Ave & Ivy St/Los Alamos Rd

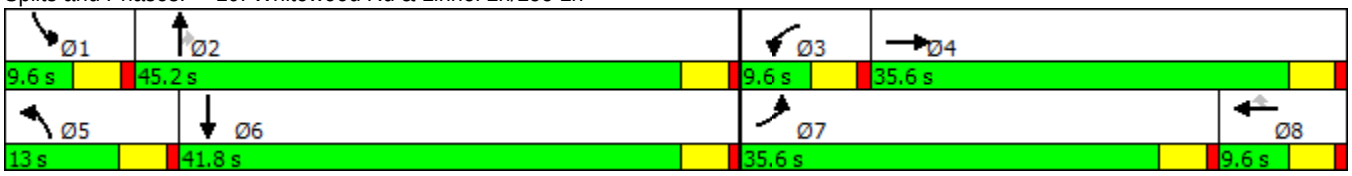


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	10	50	10	10	10	64	473	10	10	709	170
Future Volume (vph)	94	10	50	10	10	10	64	473	10	10	709	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	135		0	0		0	205		0	205		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.875				0.850			0.850		0.971	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3097	0	1770	3539	1583	1770	3539	1583	1770	3437	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3097	0	1770	3539	1583	1770	3539	1583	1770	3437	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		55				164			164		33	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1415			1455			2871			2884	
Travel Time (s)		32.2			33.1			65.3			65.5	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	103	11	55	11	11	11	70	520	11	11	779	187
Shared Lane Traffic (%)												
Lane Group Flow (vph)	103	66	0	11	11	11	70	520	11	11	966	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	35.5	35.5		9.5	9.5	9.5	9.5	27.4	27.4	9.5	32.1	
Total Split (s)	35.6	35.6		9.6	9.6	9.6	13.0	45.2	45.2	9.6	41.8	
Total Split (%)	35.6%	35.6%		9.6%	9.6%	9.6%	13.0%	45.2%	45.2%	9.6%	41.8%	
Maximum Green (s)	31.1	31.1		5.1	5.1	5.1	8.5	40.7	40.7	5.1	37.3	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)	7.0	7.0						7.0	7.0		7.0	
Flash Dont Walk (s)	24.0	24.0						15.9	15.9		20.6	
Pedestrian Calls (#/hr)	0	0						0	0		0	
Act Effct Green (s)	9.5	11.1		5.2	5.2	5.2	7.5	51.3	51.3	5.2	43.3	
Actuated g/C Ratio	0.13	0.16		0.07	0.07	0.07	0.11	0.72	0.72	0.07	0.61	
v/c Ratio	0.44	0.13		0.09	0.04	0.04	0.38	0.20	0.01	0.09	0.46	
Control Delay	36.1	11.2		36.8	35.5	0.3	38.4	6.5	0.0	36.8	12.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	36.1	11.2		36.8	35.5	0.3	38.4	6.5	0.0	36.8	12.4	
LOS	D	B		D	D	A	D	A	A	D	B	
Approach Delay		26.3			24.2			10.1			12.7	
Approach LOS		C			C			B			B	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 71.4	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.46	
Intersection Signal Delay: 13.3	Intersection LOS: B
Intersection Capacity Utilization 52.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 19: Whitewood Rd & Linnel Ln/Lee Ln

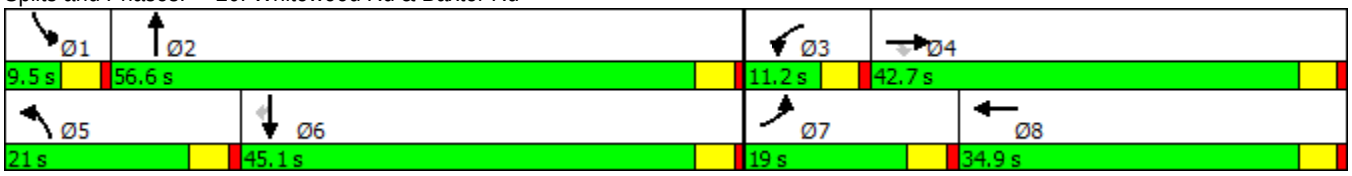


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	116	11	173	33	33	10	133	330	16	10	786	658
Future Volume (vph)	116	11	173	33	33	10	133	330	16	10	786	658
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	215		0	120		0	220		0	200		0
Storage Lanes	1		1	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850		0.965			0.993				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	3415	0	1770	3514	0	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1863	1583	1770	3415	0	1770	3514	0	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			188		11			5				715
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2823			874			2884			792	
Travel Time (s)		64.2			19.9			65.5			18.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	126	12	188	36	36	11	145	359	17	11	854	715
Shared Lane Traffic (%)												
Lane Group Flow (vph)	126	12	188	36	47	0	145	376	0	11	854	715
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	35.5	35.5	9.5	34.9		9.5	32.1		9.5	32.1	32.1
Total Split (s)	19.0	42.7	42.7	11.2	34.9		21.0	56.6		9.5	45.1	45.1
Total Split (%)	15.8%	35.6%	35.6%	9.3%	29.1%		17.5%	47.2%		7.9%	37.6%	37.6%
Maximum Green (s)	14.5	38.2	38.2	6.7	30.4		16.5	52.1		5.0	40.6	40.6
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	Max		None	Max	Max
Walk Time (s)		7.0	7.0		7.0			7.0			7.0	7.0
Flash Dont Walk (s)		24.0	24.0		23.4			20.6			20.6	20.6
Pedestrian Calls (#/hr)		0	0		0			0			0	0
Act Effct Green (s)	11.1	11.3	11.3	6.4	6.5		12.1	56.5		5.1	41.4	41.4
Actuated g/C Ratio	0.13	0.13	0.13	0.08	0.08		0.14	0.67		0.06	0.49	0.49
v/c Ratio	0.54	0.05	0.50	0.27	0.17		0.57	0.16		0.10	0.49	0.63
Control Delay	45.6	35.1	10.8	46.4	34.5		45.0	7.2		45.3	18.0	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	45.6	35.1	10.8	46.4	34.5		45.0	7.2		45.3	18.0	4.3
LOS	D	D	B	D	C		D	A		D	B	A
Approach Delay		25.2			39.7			17.7			12.0	
Approach LOS		C			D			B			B	

Intersection Summary	
Area Type: Other	
Cycle Length: 120	
Actuated Cycle Length: 84.7	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.63	
Intersection Signal Delay: 15.8	Intersection LOS: B
Intersection Capacity Utilization 63.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 20: Whitewood Rd & Baxter Rd



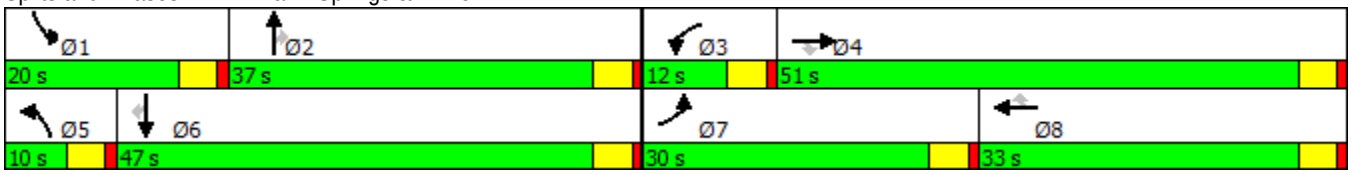
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	186	106	19	32	105	106	10	409	91	102	467	298
Future Volume (vph)	186	106	19	32	105	106	10	409	91	102	467	298
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			136			177			177			298
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		450			400			650			700	
Travel Time (s)		10.2			9.1			14.8			15.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	186	106	19	32	105	106	10	409	91	102	467	298
Shared Lane Traffic (%)												
Lane Group Flow (vph)	186	106	19	32	105	106	10	409	91	102	467	298
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	9.5	31.5	31.5	9.5	31.5	31.5	9.5	31.5	31.5	9.5	31.5	31.5
Total Split (s)	30.0	51.0	51.0	12.0	33.0	33.0	10.0	37.0	37.0	20.0	47.0	47.0
Total Split (%)	25.0%	42.5%	42.5%	10.0%	27.5%	27.5%	8.3%	30.8%	30.8%	16.7%	39.2%	39.2%
Maximum Green (s)	25.5	46.5	46.5	7.5	28.5	28.5	5.5	32.5	32.5	15.5	42.5	42.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		20.0	20.0		20.0	20.0		20.0	20.0		20.0	20.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	12.7	21.5	21.5	6.9	7.9	7.9	5.9	14.3	14.3	9.7	23.8	23.8
Actuated g/C Ratio	0.21	0.36	0.36	0.11	0.13	0.13	0.10	0.24	0.24	0.16	0.39	0.39
v/c Ratio	0.50	0.08	0.03	0.16	0.23	0.29	0.06	0.49	0.18	0.36	0.33	0.37
Control Delay	29.0	18.7	0.1	31.9	29.3	3.1	32.9	24.1	0.8	30.2	14.2	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.0	18.7	0.1	31.9	29.3	3.1	32.9	24.1	0.8	30.2	14.2	3.8
LOS	C	B	A	C	C	A	C	C	A	C	B	A
Approach Delay		23.7			18.2			20.1			12.5	
Approach LOS		C			B			C			B	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 60.4
Natural Cycle: 85
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.50
Intersection Signal Delay: 17.0 — Intersection LOS: B
Intersection Capacity Utilization 45.3% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 21: Warm Springs & Linnel Ln



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	33	44	10	97	10	198	195	10	10	859	253
Future Volume (vph)	29	33	44	10	97	10	198	195	10	10	859	253
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.993			0.966	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	3514	0	1770	3419	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	3514	0	1770	3419	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			136			136		7			39	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		4817			1737			695			730	
Travel Time (s)		109.5			39.5			15.8			16.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	29	33	44	10	97	10	198	195	10	10	859	253
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	33	44	10	97	10	198	205	0	10	1112	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Detector Phase	7	4	4	3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	9.5	31.5	31.5	9.5	31.5	31.5	9.5	31.5		9.5	31.5	
Total Split (s)	10.0	32.0	32.0	9.6	31.6	31.6	25.0	68.8		9.6	53.4	
Total Split (%)	8.3%	26.7%	26.7%	8.0%	26.3%	26.3%	20.8%	57.3%		8.0%	44.5%	
Maximum Green (s)	5.5	27.5	27.5	5.1	27.1	27.1	20.5	64.3		5.1	48.9	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)		7.0	7.0		7.0	7.0		7.0			7.0	
Flash Dont Walk (s)		20.0	20.0		20.0	20.0		20.0			20.0	
Pedestrian Calls (#/hr)		0	0		0	0		0			0	
Act Effct Green (s)	6.1	11.7	11.7	5.6	8.3	8.3	15.1	56.8		5.6	36.7	
Actuated g/C Ratio	0.08	0.15	0.15	0.07	0.11	0.11	0.20	0.74		0.07	0.48	
v/c Ratio	0.21	0.06	0.12	0.08	0.25	0.03	0.57	0.08		0.08	0.67	
Control Delay	46.3	34.5	0.7	45.1	39.7	0.2	39.0	5.1		45.1	19.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	46.3	34.5	0.7	45.1	39.7	0.2	39.0	5.1		45.1	19.2	
LOS	D	C	A	D	D	A	D	A		D	B	
Approach Delay		23.7			36.8			21.7			19.4	
Approach LOS		C			D			C			B	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 76.3
Natural Cycle: 85
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.67
Intersection Signal Delay: 21.4 — Intersection LOS: C
Intersection Capacity Utilization 62.3% — ICU Level of Service B
Analysis Period (min) 15

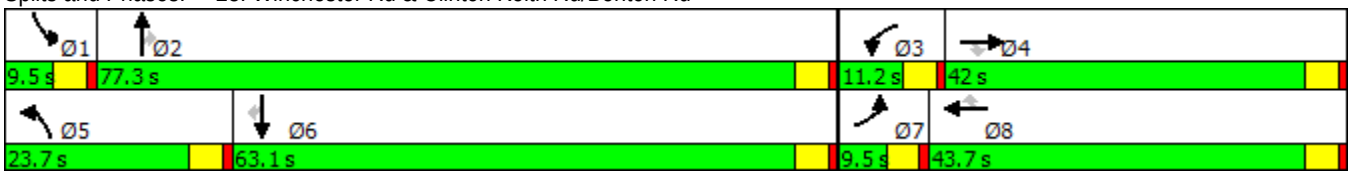
Splits and Phases: 22: Briggs Rd & Keller Rd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	257	1073	145	228	10	462	784	99	10	2074	10
Future Volume (vph)	10	257	1073	145	228	10	462	784	99	10	2074	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		150	0		0	0		0	0		0
Storage Lanes	2		2	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.88	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	2787	3433	3539	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3539	2787	3433	3539	1583	3433	5085	1583	3433	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			364			117			99			117
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		4370			1699			998			766	
Travel Time (s)		99.3			38.6			22.7			17.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	10	257	1073	145	228	10	462	784	99	10	2074	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	10	257	1073	145	228	10	462	784	99	10	2074	10
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	9.5	42.0	42.0	11.2	43.7	43.7	23.7	77.3	77.3	9.5	63.1	63.1
Total Split (%)	6.8%	30.0%	30.0%	8.0%	31.2%	31.2%	16.9%	55.2%	55.2%	6.8%	45.1%	45.1%
Maximum Green (s)	5.0	37.5	37.5	6.7	39.2	39.2	19.2	72.8	72.8	5.0	58.6	58.6
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	5.0	37.5	37.5	6.7	46.8	46.8	19.2	80.4	80.4	5.0	58.6	58.6
Actuated g/C Ratio	0.04	0.27	0.27	0.05	0.33	0.33	0.14	0.57	0.57	0.04	0.42	0.42
v/c Ratio	0.08	0.27	1.06	0.88	0.19	0.02	0.98	0.27	0.10	0.08	0.97	0.01
Control Delay	66.8	41.4	77.6	110.5	34.4	0.0	97.2	15.6	3.1	66.8	54.3	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.8	41.4	77.6	110.5	34.4	0.0	97.2	15.6	3.1	66.8	54.3	0.0
LOS	E	D	E	F	C	A	F	B	A	E	D	A
Approach Delay		70.6			62.3			42.7			54.1	
Approach LOS		E			E			D			D	

Intersection Summary	
Area Type: Other	
Cycle Length: 140	
Actuated Cycle Length: 140	
Natural Cycle: 140	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.06	
Intersection Signal Delay: 56.0	Intersection LOS: E
Intersection Capacity Utilization 93.0%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 23: Winchester Rd & Clinton Keith Rd/Benton Rd

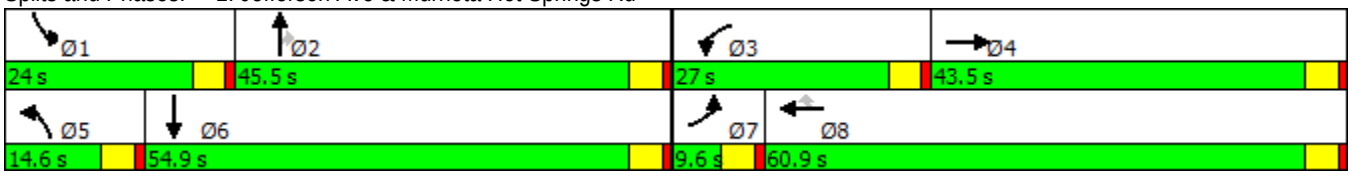


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	193	17	312	129	663	52	1522	1067	523	723	13
Future Volume (vph)	30	193	17	312	129	663	52	1522	1067	523	723	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		265	0		280	185		0
Storage Lanes	1		0	1		1	1		2	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	0.91	0.88	0.97	0.91	0.91
Frt		0.988				0.850			0.850		0.997	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	5024	0	1770	5085	1583	1770	5085	2787	3433	5070	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	5024	0	1770	5085	1583	1770	5085	2787	3433	5070	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10				296			849		2	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		687			1412			1630			2768	
Travel Time (s)		15.6			32.1			37.0			62.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	210	18	339	140	721	57	1654	1160	568	786	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	33	228	0	339	140	721	57	1654	1160	568	800	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		36			36			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	43.5		9.5	44.4	44.4	9.5	33.8	33.8	9.5	22.5	
Total Split (s)	9.6	43.5		27.0	60.9	60.9	14.6	45.5	45.5	24.0	54.9	
Total Split (%)	6.9%	31.1%		19.3%	43.5%	43.5%	10.4%	32.5%	32.5%	17.1%	39.2%	
Maximum Green (s)	5.1	39.0		22.5	56.4	56.4	10.1	41.0	41.0	19.5	50.4	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0		7.0	7.0			
Flash Dont Walk (s)		32.0			32.9	32.9		22.3	22.3			
Pedestrian Calls (#/hr)		0			0	0		0	0			
Act Effct Green (s)	5.2	26.7		22.7	48.7	48.7	8.7	41.5	41.5	19.7	54.9	
Actuated g/C Ratio	0.04	0.21		0.18	0.38	0.38	0.07	0.32	0.32	0.15	0.43	
v/c Ratio	0.47	0.22		1.09	0.07	0.92	0.48	1.01	0.79	1.08	0.37	
Control Delay	86.0	39.3		125.6	25.7	40.6	74.8	68.8	15.3	114.1	28.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	86.0	39.3		125.6	25.7	40.6	74.8	68.8	15.3	114.1	28.7	
LOS	F	D		F	C	D	E	E	B	F	C	
Approach Delay		45.2			62.9			47.3			64.2	
Approach LOS		D			E			D			E	

Intersection Summary	
Area Type: Other	
Cycle Length: 140	
Actuated Cycle Length: 128.8	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.09	
Intersection Signal Delay: 54.6	Intersection LOS: D
Intersection Capacity Utilization 85.9%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 1: Jefferson Ave & Murrieta Hot Springs Rd

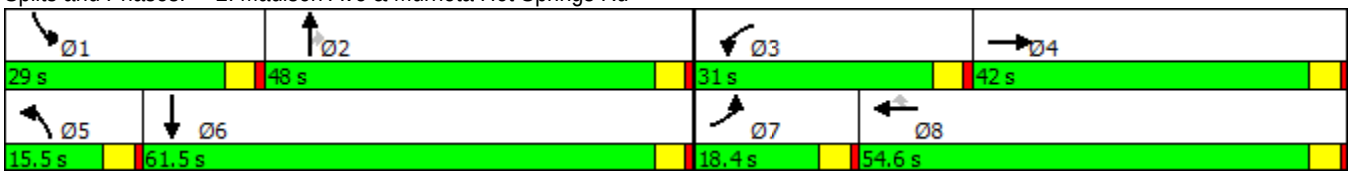


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	252	1544	93	632	1128	556	123	916	660	585	469	77
Future Volume (vph)	252	1544	93	632	1128	556	123	916	660	585	469	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	250		0	100		100	165		0
Storage Lanes	2		0	2		1	2		2	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.86	0.86	0.97	0.91	1.00	0.97	0.95	0.88	0.97	0.95	0.95
Frt		0.992				0.850			0.850		0.979	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	6357	0	3433	5085	1583	3433	3539	2787	3433	3465	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	6357	0	3433	5085	1583	3433	3539	2787	3433	3465	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8				290			231		14	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1412			2198			1707			1381	
Travel Time (s)		32.1			50.0			38.8			31.4	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	283	1735	104	710	1267	625	138	1029	742	657	527	87
Shared Lane Traffic (%)												
Lane Group Flow (vph)	283	1839	0	710	1267	625	138	1029	742	657	614	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	35.5		9.5	38.4	38.4	9.5	45.2	45.2	9.5	45.2	
Total Split (s)	18.4	42.0		31.0	54.6	54.6	15.5	48.0	48.0	29.0	61.5	
Total Split (%)	12.3%	28.0%		20.7%	36.4%	36.4%	10.3%	32.0%	32.0%	19.3%	41.0%	
Maximum Green (s)	13.9	37.5		26.5	50.1	50.1	11.0	43.5	43.5	24.5	57.0	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		24.0			26.9	26.9		33.7	33.7		33.7	
Pedestrian Calls (#/hr)		0			0	0		0	0		0	
Act Effct Green (s)	13.9	37.5		26.5	50.1	50.1	10.3	43.5	43.5	24.5	57.7	
Actuated g/C Ratio	0.09	0.25		0.18	0.33	0.33	0.07	0.29	0.29	0.16	0.38	
v/c Ratio	0.89	1.15		1.17	0.75	0.87	0.59	1.00	0.76	1.17	0.46	
Control Delay	95.7	125.4		146.2	47.6	38.1	78.3	81.3	38.7	148.6	35.1	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	95.7	125.4		146.2	47.6	38.1	78.3	81.3	38.7	148.6	35.1	
LOS	F	F		F	D	D	E	F	D	F	D	
Approach Delay		121.5			72.2			64.6			93.7	
Approach LOS		F			E			E			F	

Intersection Summary	
Area Type:	Other
Cycle Length: 150	
Actuated Cycle Length: 150	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.17	
Intersection Signal Delay: 87.1	Intersection LOS: F
Intersection Capacity Utilization 99.0%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 2: Madison Ave & Murrieta Hot Springs Rd

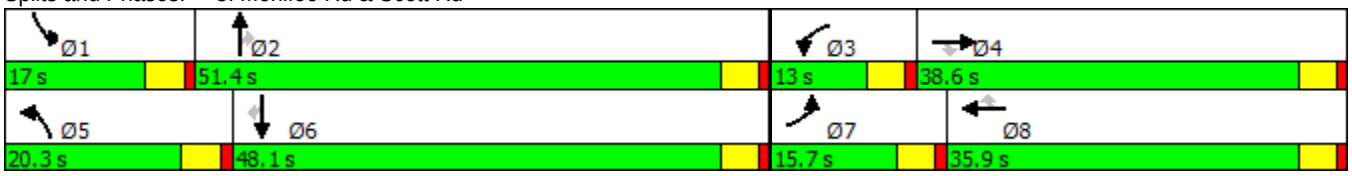


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	176	740	126	142	704	115	121	1045	252	99	551	71
Future Volume (vph)	176	740	126	142	704	115	121	1045	252	99	551	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	195		0	155		0	150		0
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	1770	3539	1583	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			127			116			248			95
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		804			428			403			545	
Travel Time (s)		18.3			9.7			9.2			12.4	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	178	747	127	143	711	116	122	1056	255	100	557	72
Shared Lane Traffic (%)												
Lane Group Flow (vph)	178	747	127	143	711	116	122	1056	255	100	557	72
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	38.6	38.6	9.5	9.5	9.5	9.5	9.5	9.5	9.5	36.6	36.6
Total Split (s)	15.7	38.6	38.6	13.0	35.9	35.9	20.3	51.4	51.4	17.0	48.1	48.1
Total Split (%)	13.1%	32.2%	32.2%	10.8%	29.9%	29.9%	16.9%	42.8%	42.8%	14.2%	40.1%	40.1%
Maximum Green (s)	11.2	34.1	34.1	8.5	31.4	31.4	15.8	46.9	46.9	12.5	43.6	43.6
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)		7.0	7.0								7.0	7.0
Flash Dont Walk (s)		27.1	27.1								25.1	25.1
Pedestrian Calls (#/hr)		0	0								0	0
Act Effct Green (s)	10.1	24.9	24.9	8.2	23.0	23.0	12.3	47.2	47.2	10.5	45.4	45.4
Actuated g/C Ratio	0.09	0.23	0.23	0.08	0.21	0.21	0.11	0.43	0.43	0.10	0.42	0.42
v/c Ratio	0.56	0.64	0.28	0.55	0.66	0.27	0.61	0.69	0.31	0.59	0.38	0.10
Control Delay	55.8	40.6	7.4	59.0	42.6	8.2	60.8	29.2	4.3	63.1	24.5	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.8	40.6	7.4	59.0	42.6	8.2	60.8	29.2	4.3	63.1	24.5	3.0
LOS	E	D	A	E	D	A	E	C	A	E	C	A
Approach Delay		39.2			40.9			27.4			27.6	
Approach LOS		D			D			C			C	

Intersection Summary	
Area Type: Other	
Cycle Length: 120	
Actuated Cycle Length: 108.9	
Natural Cycle: 95	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.69	
Intersection Signal Delay: 33.5	Intersection LOS: C
Intersection Capacity Utilization 68.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 3: Menifee Rd & Scott Rd



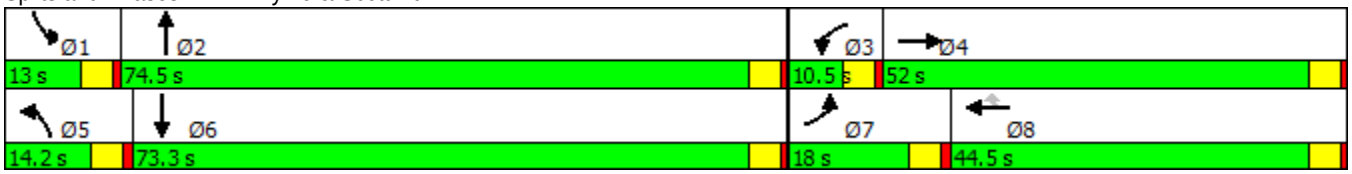
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	203	67	49	10	143	484	77	3041	0	225	2060	115
Future Volume (vph)	203	67	49	10	143	484	77	3041	0	225	2060	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	0.91	0.91	0.97	0.91	0.91
Frt		0.937				0.850					0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	4765	0	1770	5085	1583	1770	5085	0	3433	5045	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	4765	0	1770	5085	1583	1770	5085	0	3433	5045	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		53				112					7	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1266			804			669			738	
Travel Time (s)		28.8			18.3			15.2			16.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	221	73	53	11	155	526	84	3305	0	245	2239	125
Shared Lane Traffic (%)												
Lane Group Flow (vph)	221	126	0	11	155	526	84	3305	0	245	2364	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Detector Phase	7	4		3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	9.5	50.9		9.5	9.5	9.5	9.5	41.9		9.5	49.8	
Total Split (s)	18.0	52.0		10.5	44.5	44.5	14.2	74.5		13.0	73.3	
Total Split (%)	12.0%	34.7%		7.0%	29.7%	29.7%	9.5%	49.7%		8.7%	48.9%	
Maximum Green (s)	13.5	47.5		6.0	40.0	40.0	9.7	70.0		8.5	68.8	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max		None	Max	
Walk Time (s)		7.0						7.0			7.0	
Flash Dont Walk (s)		39.4						30.4			38.3	
Pedestrian Calls (#/hr)		0						0			0	
Act Effct Green (s)	13.5	53.8		5.8	40.0	40.0	9.4	70.0		8.5	69.1	
Actuated g/C Ratio	0.09	0.36		0.04	0.27	0.27	0.06	0.47		0.06	0.46	
v/c Ratio	1.39	0.07		0.16	0.11	1.04	0.76	1.39		1.26	1.02	
Control Delay	256.4	19.5		75.1	41.9	93.1	106.9	212.2		206.6	62.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	256.4	19.5		75.1	41.9	93.1	106.9	212.2		206.6	62.4	
LOS	F	B		E	D	F	F	F		F	E	
Approach Delay		170.4			81.3			209.6			75.9	
Approach LOS		F			F			F			E	

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.39
Intersection Signal Delay: 145.5 — Intersection LOS: F
Intersection Capacity Utilization 111.2% — ICU Level of Service H
Analysis Period (min) 15

Splits and Phases: 4: Hwy 79 & Scott Rd

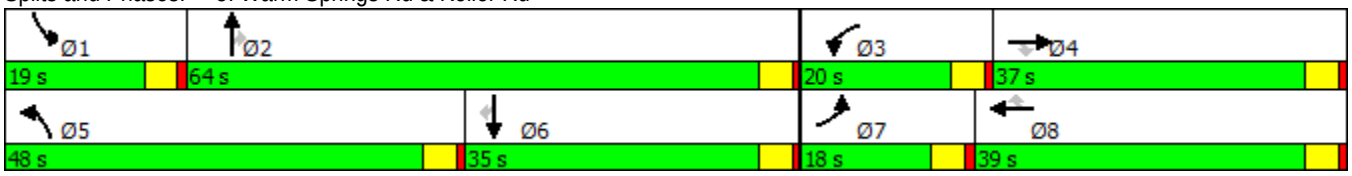


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	142	419	336	79	570	110	646	401	60	71	191	112
Future Volume (vph)	142	419	336	79	570	110	646	401	60	71	191	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	120		0	195		0	110		110	120		0
Storage Lanes	2		1	1		1	2		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	3433	3539	1583	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	1770	5085	1583	3433	3539	1583	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			357			117			82			119
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1361			4817			5440			744	
Travel Time (s)		30.9			109.5			123.6			16.9	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	151	446	357	84	606	117	687	427	64	76	203	119
Shared Lane Traffic (%)												
Lane Group Flow (vph)	151	446	357	84	606	117	687	427	64	76	203	119
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	29.2	29.2	9.5	26.9	26.9	9.5	30.9	30.9	9.5	29.2	29.2
Total Split (s)	18.0	37.0	37.0	20.0	39.0	39.0	48.0	64.0	64.0	19.0	35.0	35.0
Total Split (%)	12.9%	26.4%	26.4%	14.3%	27.9%	27.9%	34.3%	45.7%	45.7%	13.6%	25.0%	25.0%
Maximum Green (s)	13.5	32.5	32.5	15.5	34.5	34.5	43.5	59.5	59.5	14.5	30.5	30.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		17.7	17.7		15.4	15.4		19.4	19.4		17.7	17.7
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	10.5	23.5	23.5	10.9	21.2	21.2	28.9	60.3	60.3	10.4	39.1	39.1
Actuated g/C Ratio	0.09	0.20	0.20	0.09	0.18	0.18	0.25	0.51	0.51	0.09	0.33	0.33
v/c Ratio	0.50	0.44	0.59	0.51	0.66	0.31	0.82	0.24	0.08	0.49	0.17	0.20
Control Delay	59.1	45.0	9.0	64.8	49.4	9.8	51.1	18.6	2.8	65.0	31.4	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.1	45.0	9.0	64.8	49.4	9.8	51.1	18.6	2.8	65.0	31.4	7.2
LOS	E	D	A	E	D	A	D	B	A	E	C	A
Approach Delay		33.8			45.3			36.7			30.6	
Approach LOS		C			D			D			C	

Intersection Summary	
Area Type: Other	
Cycle Length: 140	
Actuated Cycle Length: 117.9	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 37.2	Intersection LOS: D
Intersection Capacity Utilization 53.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 5: Warm Springs Rd & Keller Rd

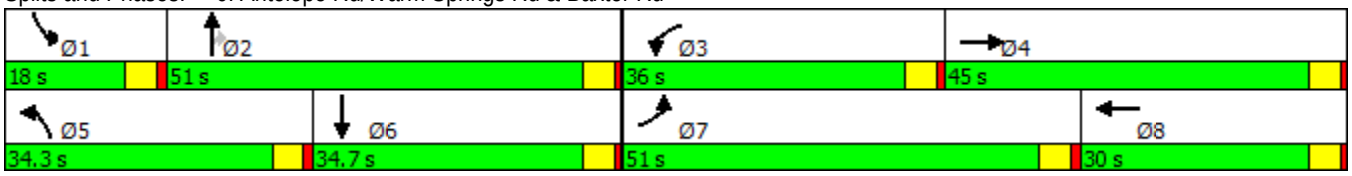


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	395	462	340	267	198	103	224	406	399	94	228	170
Future Volume (vph)	395	462	340	267	198	103	224	406	399	94	228	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		20	150		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.936			0.949				0.850		0.936	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3313	0	1770	3359	0	1770	3539	1583	1770	3313	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3313	0	1770	3359	0	1770	3539	1583	1770	3313	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		122			54				117		114	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		620			2823			806			5440	
Travel Time (s)		14.1			64.2			18.3			123.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	395	462	340	267	198	103	224	406	399	94	228	170
Shared Lane Traffic (%)												
Lane Group Flow (vph)	395	802	0	267	301	0	224	406	399	94	398	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	28.5		9.5	28.5		9.5	34.9	34.9	9.5	28.5	
Total Split (s)	51.0	45.0		36.0	30.0		34.3	51.0	51.0	18.0	34.7	
Total Split (%)	34.0%	30.0%		24.0%	20.0%		22.9%	34.0%	34.0%	12.0%	23.1%	
Maximum Green (s)	46.5	40.5		31.5	25.5		29.8	46.5	46.5	13.5	30.2	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0			7.0	7.0		7.0	
Flash Dont Walk (s)		17.0			17.0			17.0	17.0		17.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effct Green (s)	35.4	34.4		25.0	24.0		22.2	47.1	47.1	11.5	36.3	
Actuated g/C Ratio	0.26	0.25		0.18	0.18		0.16	0.35	0.35	0.08	0.27	
v/c Ratio	0.86	0.87		0.82	0.47		0.78	0.33	0.64	0.63	0.41	
Control Delay	66.9	52.2		75.3	44.9		74.1	36.2	33.6	82.2	33.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	66.9	52.2		75.3	44.9		74.1	36.2	33.6	82.2	33.2	
LOS	E	D		E	D		E	D	C	F	C	
Approach Delay		57.0			59.1			43.4			42.6	
Approach LOS		E			E			D			D	

Intersection Summary	
Area Type: Other	
Cycle Length: 150	
Actuated Cycle Length: 136.1	
Natural Cycle: 95	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 51.0	Intersection LOS: D
Intersection Capacity Utilization 77.6%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 6: Antelope Rd/Warm Springs Rd & Baxter Rd

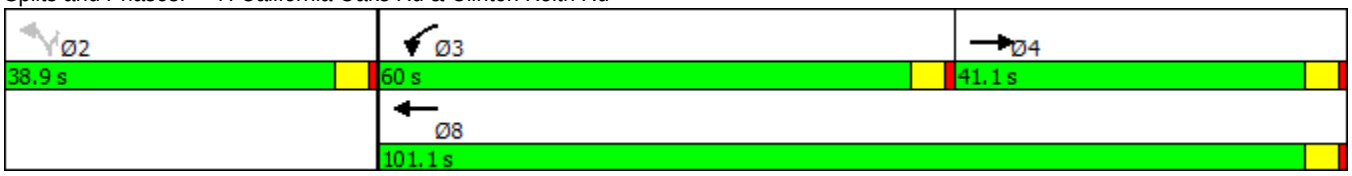


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1133	223	720	1150	273	758
Future Volume (vph)	1133	223	720	1150	273	758
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	225		100	0
Storage Lanes		0	1		1	2
Taper Length (ft)			25		25	
Lane Util. Factor	0.91	0.91	1.00	0.91	1.00	0.88
Frt	0.975					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	4958	0	1770	5085	1770	2787
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	4958	0	1770	5085	1770	2787
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	28					798
Link Speed (mph)	30			30	30	
Link Distance (ft)	2233			3569	625	
Travel Time (s)	50.8			81.1	14.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1193	235	758	1211	287	798
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1428	0	758	1211	287	798
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Number of Detectors	2		1	2	1	1
Detector Template	Thru		Left	Thru	Left	Right
Leading Detector (ft)	100		20	100	20	20
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	6		20	6	20	20
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Prot	NA	Perm	Perm
Protected Phases	4		3	8		
Permitted Phases					2	2

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	4		3	8	2	2
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0
Minimum Split (s)	36.6		9.5	9.5	37.2	37.2
Total Split (s)	41.1		60.0	101.1	38.9	38.9
Total Split (%)	29.4%		42.9%	72.2%	27.8%	27.8%
Maximum Green (s)	36.6		55.5	96.6	34.4	34.4
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5		4.5	4.5	4.5	4.5
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	None	Max	Max
Walk Time (s)	7.0				7.0	7.0
Flash Dont Walk (s)	25.1				25.7	25.7
Pedestrian Calls (#/hr)	0				0	0
Act Effct Green (s)	36.6		55.5	96.6	34.4	34.4
Actuated g/C Ratio	0.26		0.40	0.69	0.25	0.25
v/c Ratio	1.09		1.08	0.35	0.66	0.62
Control Delay	98.5		98.3	9.1	56.0	5.1
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	98.5		98.3	9.1	56.0	5.1
LOS	F		F	A	E	A
Approach Delay	98.5			43.5	18.5	
Approach LOS	F			D	B	

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 140	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.09	
Intersection Signal Delay: 54.9	Intersection LOS: D
Intersection Capacity Utilization 93.1%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 7: California Oaks Rd & Clinton Keith Rd

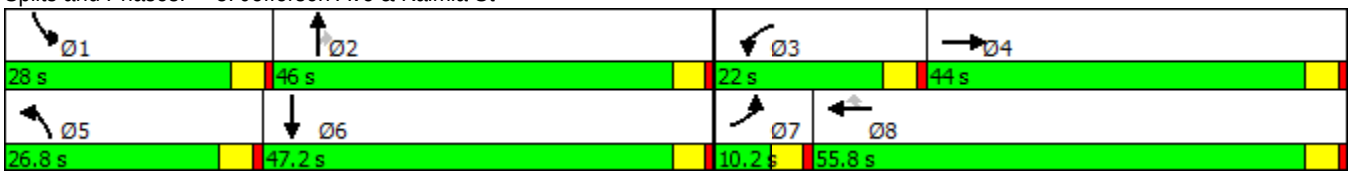


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	561	199	171	489	281	338	1154	506	232	642	22
Future Volume (vph)	16	561	199	171	489	281	338	1154	506	232	642	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		140	235		0	205		0	145		0
Storage Lanes	1		0	1		1	2		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.95	1.00	0.97	0.91	1.00	1.00	0.91	0.91
Frt		0.961				0.850			0.850		0.995	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	4887	0	1770	3539	1583	3433	5085	1583	1770	5060	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	4887	0	1770	3539	1583	3433	5085	1583	1770	5060	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		64				309			265		4	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1399			684			2782			1004	
Travel Time (s)		31.8			15.5			63.2			22.8	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	18	616	219	188	537	309	371	1268	556	255	705	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	18	835	0	188	537	309	371	1268	556	255	729	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	44.0		9.5	34.9	34.9	9.5	38.6	38.6	9.5	39.5	
Total Split (s)	10.2	44.0		22.0	55.8	55.8	26.8	46.0	46.0	28.0	47.2	
Total Split (%)	7.3%	31.4%		15.7%	39.9%	39.9%	19.1%	32.9%	32.9%	20.0%	33.7%	
Maximum Green (s)	5.7	39.5		17.5	51.3	51.3	22.3	41.5	41.5	23.5	42.7	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		32.5			23.4	23.4		27.1	27.1		28.0	
Pedestrian Calls (#/hr)		0			0	0		0	0		0	
Act Effct Green (s)	5.7	27.9		16.6	45.2	45.2	18.4	41.8	41.8	21.6	45.0	
Actuated g/C Ratio	0.05	0.22		0.13	0.36	0.36	0.15	0.33	0.33	0.17	0.36	
v/c Ratio	0.23	0.74		0.81	0.42	0.40	0.74	0.75	0.79	0.84	0.40	
Control Delay	68.6	46.3		79.7	32.5	5.0	61.9	42.1	29.9	75.5	32.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	68.6	46.3		79.7	32.5	5.0	61.9	42.1	29.9	75.5	32.4	
LOS	E	D		E	C	A	E	D	C	E	C	
Approach Delay		46.8			32.8			42.4			43.6	
Approach LOS		D			C			D			D	

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 126	
Natural Cycle: 115	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 41.4	Intersection LOS: D
Intersection Capacity Utilization 74.9%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 8: Jefferson Ave & Kalmia St

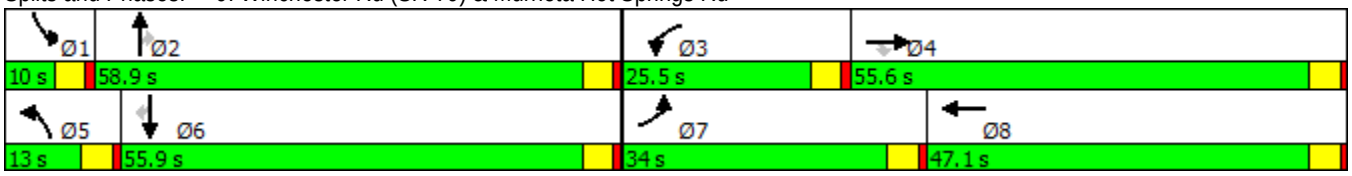


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1542	775	192	310	1042	297	325	2297	198	177	1166	1048
Future Volume (vph)	1542	775	192	310	1042	297	325	2297	198	177	1166	1048
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	195		200	195		200	205		0	210		0
Storage Lanes	2		1	2		0	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	0.91	0.97	0.91	1.00	0.97	0.91	1.00
Frt			0.850		0.967				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	3433	4917	0	3433	5085	1583	3433	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	4917	0	3433	5085	1583	3433	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			96		48				109			376
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1422			1339			680			585	
Travel Time (s)		32.3			30.4			15.5			13.3	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1590	799	198	320	1074	306	335	2368	204	182	1202	1080
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1590	799	198	320	1380	0	335	2368	204	182	1202	1080
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4						2			6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	9.5	9.5	9.5	47.1		9.5	44.4	44.4	9.5	44.9	44.9
Total Split (s)	34.0	55.6	55.6	25.5	47.1		13.0	58.9	58.9	10.0	55.9	55.9
Total Split (%)	22.7%	37.1%	37.1%	17.0%	31.4%		8.7%	39.3%	39.3%	6.7%	37.3%	37.3%
Maximum Green (s)	29.5	51.1	51.1	21.0	42.6		8.5	54.4	54.4	5.5	51.4	51.4
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	Max	Max	None	Max	Max
Walk Time (s)					7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)					35.6			32.9	32.9		33.4	33.4
Pedestrian Calls (#/hr)					0			0	0		0	0
Act Effct Green (s)	29.5	53.5	53.5	18.6	42.6		8.5	54.4	54.4	5.5	51.4	51.4
Actuated g/C Ratio	0.20	0.36	0.36	0.12	0.28		0.06	0.36	0.36	0.04	0.34	0.34
v/c Ratio	2.36	0.44	0.32	0.75	0.97		1.73	1.28	0.32	1.46	0.69	1.37
Control Delay	640.1	38.1	19.5	75.1	67.6		386.1	171.4	16.9	290.5	45.0	199.6
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	640.1	38.1	19.5	75.1	67.6		386.1	171.4	16.9	290.5	45.0	199.6
LOS	F	D	B	E	E		F	F	B	F	D	F
Approach Delay		406.7			69.0			185.3			130.9	
Approach LOS		F			E			F			F	

Intersection Summary	
Area Type: Other	
Cycle Length: 150	
Actuated Cycle Length: 150	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 2.36	
Intersection Signal Delay: 210.3	Intersection LOS: F
Intersection Capacity Utilization 135.2%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 9: Winchester Rd (SR-79) & Murrieta Hot Springs Rd



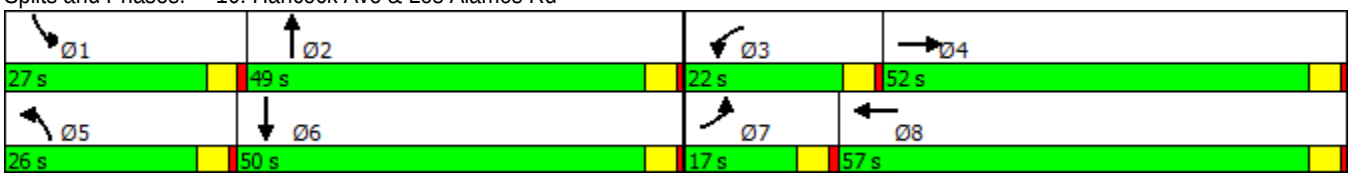
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	143	1094	69	212	672	656	187	454	610	539	261	126
Future Volume (vph)	143	1094	69	212	672	656	187	454	610	539	261	126
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	100		0	100		0	225		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	0.97	1.00	1.00
Frt		0.991			0.926			0.914			0.951	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3507	0	1770	3277	0	1770	3235	0	3433	1771	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3507	0	1770	3277	0	1770	3235	0	3433	1771	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			180			178			17	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		440			1059			599			686	
Travel Time (s)		10.0			24.1			13.6			15.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	155	1189	75	230	730	713	203	493	663	586	284	137
Shared Lane Traffic (%)												
Lane Group Flow (vph)	155	1264	0	230	1443	0	203	1156	0	586	421	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	36.4		9.5	36.4		9.5	36.9		9.5	36.4	
Total Split (s)	17.0	52.0		22.0	57.0		26.0	49.0		27.0	50.0	
Total Split (%)	11.3%	34.7%		14.7%	38.0%		17.3%	32.7%		18.0%	33.3%	
Maximum Green (s)	12.5	47.5		17.5	52.5		21.5	44.5		22.5	45.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Max		None	Max	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		24.9			24.9			25.4			24.9	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	12.5	47.5		17.5	52.5		20.1	44.5		22.5	46.9	
Actuated g/C Ratio	0.08	0.32		0.12	0.35		0.13	0.30		0.15	0.31	
v/c Ratio	1.05	1.14		1.12	1.14		0.86	1.12dr		1.14	0.75	
Control Delay	152.8	118.2		155.4	112.5		94.2	88.9		139.5	54.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	152.8	118.2		155.4	112.5		94.2	88.9		139.5	54.0	
LOS	F	F		F	F		F	F		F	D	
Approach Delay		122.0			118.4			89.7			103.8	
Approach LOS		F			F			F			F	

Intersection Summary	
Area Type: Other	
Cycle Length: 150	
Actuated Cycle Length: 150	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.14	
Intersection Signal Delay: 109.5	Intersection LOS: F
Intersection Capacity Utilization 110.1%	ICU Level of Service H
Analysis Period (min) 15	

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 10: Hancock Ave & Los Alamos Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1734	308	191	964	0	0	0	0	220	0	836
Future Volume (vph)	0	1734	308	191	964	0	0	0	0	220	0	836
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		95	100		0	0		0	305		305
Storage Lanes	0		1	2		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	0.95	0.91	0.95
Frt			0.850								0.858	0.850
Flt Protected				0.950						0.950	0.997	
Satd. Flow (prot)	0	3539	1583	3433	3539	0	0	0	0	1681	1450	1504
Flt Permitted				0.950						0.950	0.997	
Satd. Flow (perm)	0	3539	1583	3433	3539	0	0	0	0	1681	1450	1504
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			123								140	140
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1059			394			642			451	
Travel Time (s)		24.1			9.0			14.6			10.3	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	1788	318	197	994	0	0	0	0	227	0	862
Shared Lane Traffic (%)										10%		49%
Lane Group Flow (vph)	0	1788	318	197	994	0	0	0	0	204	445	440
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2	1	1	2					1	2	1
Detector Template		Thru	Right	Left	Thru					Left	Thru	Right
Leading Detector (ft)		100	20	20	100					20	100	20
Trailing Detector (ft)		0	0	0	0					0	0	0
Detector 1 Position(ft)		0	0	0	0					0	0	0
Detector 1 Size(ft)		6	20	20	6					20	6	20
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Detector 2 Position(ft)		94			94						94	
Detector 2 Size(ft)		6			6						6	
Detector 2 Type		Cl+Ex			Cl+Ex						Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0						0.0	
Turn Type		NA	Perm	Prot	NA					Prot	NA	Perm
Protected Phases		4		3	8					1	6	
Permitted Phases			4									6

11: I-215 SB On-Ramp/I-215 SB Off-Ramp & Los Alamos Rd

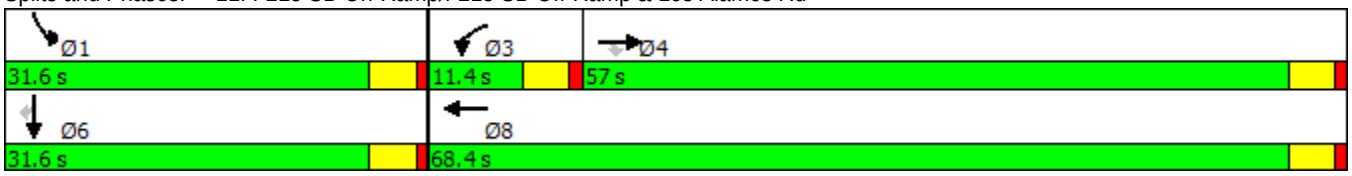
Timing Plan: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		4	4	3	8					1	6	6
Switch Phase												
Minimum Initial (s)		5.0	5.0	5.0	5.0					5.0	5.0	5.0
Minimum Split (s)		34.6	34.6	9.5	28.4					9.5	9.5	9.5
Total Split (s)		57.0	57.0	11.4	68.4					31.6	31.6	31.6
Total Split (%)		57.0%	57.0%	11.4%	68.4%					31.6%	31.6%	31.6%
Maximum Green (s)		52.5	52.5	6.9	63.9					27.1	27.1	27.1
Yellow Time (s)		3.5	3.5	3.5	3.5					3.5	3.5	3.5
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Lost Time (s)		4.5	4.5	4.5	4.5					4.5	4.5	4.5
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		None	None	None	None					None	Max	Max
Walk Time (s)		7.0	7.0		7.0							
Flash Dont Walk (s)		23.1	23.1		16.9							
Pedestrian Calls (#/hr)		0	0		0							
Act Effct Green (s)		52.5	52.5	6.9	63.9					27.1	27.1	27.1
Actuated g/C Ratio		0.52	0.52	0.07	0.64					0.27	0.27	0.27
v/c Ratio		0.96	0.36	0.83	0.44					0.45	0.90	0.86
Control Delay		37.4	9.4	75.0	9.8					34.0	47.1	42.1
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Delay		37.4	9.4	75.0	9.8					34.0	47.1	42.1
LOS		D	A	E	A					C	D	D
Approach Delay		33.2			20.6						42.6	
Approach LOS		C			C						D	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.96
Intersection Signal Delay: 32.1 Intersection LOS: C
Intersection Capacity Utilization 79.3% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 11: I-215 SB On-Ramp/I-215 SB Off-Ramp & Los Alamos Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	176	1804	52	80	1865	467	52	311	191	467	81	121
Future Volume (vph)	176	1804	52	80	1865	467	52	311	191	467	81	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	215		0	150		0	150		0	225		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.996			0.970				0.850		0.910	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	5065	0	1770	4933	0	1770	3539	1583	1770	3221	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	5065	0	1770	4933	0	1770	3539	1583	1770	3221	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			46				115		129	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		764			996			580			564	
Travel Time (s)		17.4			22.6			13.2			12.8	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	187	1919	55	85	1984	497	55	331	203	497	86	129
Shared Lane Traffic (%)												
Lane Group Flow (vph)	187	1974	0	85	2481	0	55	331	203	497	215	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			

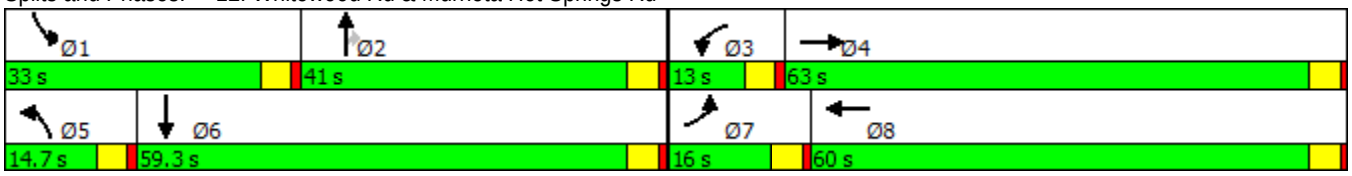
12: Whitewood Rd & Murrieta Hot Springs Rd

Timing Plan: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	26.6		9.5	32.6		9.5	38.6	38.6	9.5	38.9	
Total Split (s)	16.0	63.0		13.0	60.0		14.7	41.0	41.0	33.0	59.3	
Total Split (%)	10.7%	42.0%		8.7%	40.0%		9.8%	27.3%	27.3%	22.0%	39.5%	
Maximum Green (s)	11.5	58.5		8.5	55.5		10.2	36.5	36.5	28.5	54.8	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0			7.0	7.0		7.0	
Flash Dont Walk (s)		15.1			21.1			27.1	27.1		27.4	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effct Green (s)	11.5	58.5		8.5	55.5		9.0	36.5	36.5	28.5	58.1	
Actuated g/C Ratio	0.08	0.39		0.06	0.37		0.06	0.24	0.24	0.19	0.39	
v/c Ratio	1.39	1.00		0.85	1.34		0.52	0.38	0.43	1.48	0.16	
Control Delay	260.2	65.1		124.7	193.0		85.5	49.0	23.3	271.9	13.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	260.2	65.1		124.7	193.0		85.5	49.0	23.3	271.9	13.0	
LOS	F	E		F	F		F	D	C	F	B	
Approach Delay		82.0			190.7			43.5			193.7	
Approach LOS		F			F			D			F	

Intersection Summary	
Area Type:	Other
Cycle Length: 150	
Actuated Cycle Length: 150	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.48	
Intersection Signal Delay: 137.7	Intersection LOS: F
Intersection Capacity Utilization 105.7%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 12: Whitewood Rd & Murrieta Hot Springs Rd

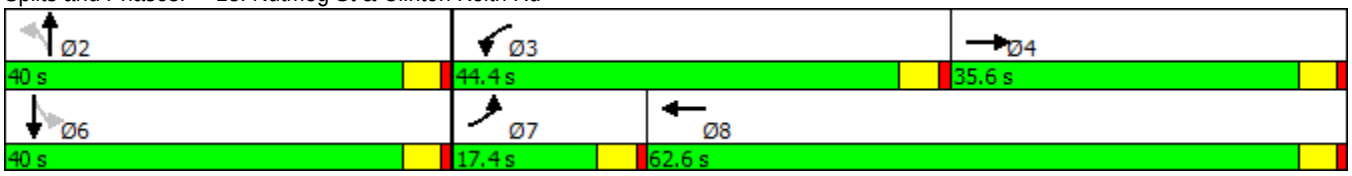


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	858	82	372	697	151	71	49	313	110	49	50
Future Volume (vph)	87	858	82	372	697	151	71	49	313	110	49	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	225		0	180		0	50		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.987			0.973			0.870			0.924	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	5019	0	1770	4948	0	1770	3079	0	1770	3270	0
Flt Permitted	0.950			0.950			0.686			0.458		
Satd. Flow (perm)	1770	5019	0	1770	4948	0	1278	3079	0	853	3270	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			55			333			53	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		471			2233			1168			1110	
Travel Time (s)		10.7			50.8			26.5			25.2	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	93	913	87	396	741	161	76	52	333	117	52	53
Shared Lane Traffic (%)												
Lane Group Flow (vph)	93	1000	0	396	902	0	76	385	0	117	105	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	32.1		9.5	9.5		38.6	38.6		9.5	9.5	
Total Split (s)	17.4	35.6		44.4	62.6		40.0	40.0		40.0	40.0	
Total Split (%)	14.5%	29.7%		37.0%	52.2%		33.3%	33.3%		33.3%	33.3%	
Maximum Green (s)	12.9	31.1		39.9	58.1		35.5	35.5		35.5	35.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)		7.0					7.0	7.0				
Flash Dont Walk (s)		20.6					27.1	27.1				
Pedestrian Calls (#/hr)		0					0	0				
Act Effct Green (s)	10.4	27.9		28.8	48.9		35.9	35.9		35.9	35.9	
Actuated g/C Ratio	0.10	0.26		0.27	0.46		0.34	0.34		0.34	0.34	
v/c Ratio	0.54	0.75		0.83	0.39		0.18	0.31		0.41	0.09	
Control Delay	59.8	40.3		51.7	18.5		29.8	6.1		35.8	15.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	59.8	40.3		51.7	18.5		29.8	6.1		35.8	15.5	
LOS	E	D		D	B		C	A		D	B	
Approach Delay		41.9			28.7			10.0			26.2	
Approach LOS		D			C			B			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 106.2	
Natural Cycle: 95	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 30.4	Intersection LOS: C
Intersection Capacity Utilization 71.6%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 13: Nutmeg St & Clinton Keith Rd



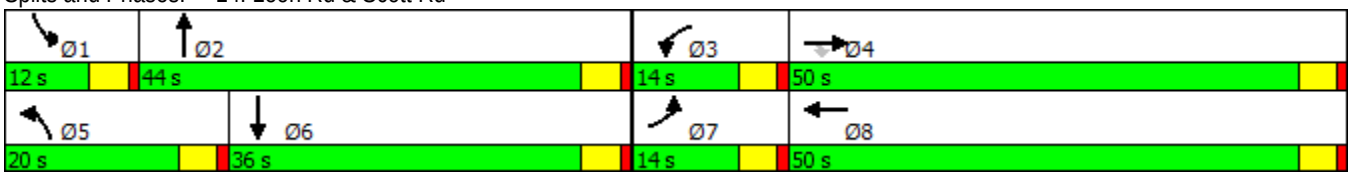
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	335	340	16	346	22	137	55	35	12	27	10
Future Volume (vph)	16	335	340	16	346	22	137	55	35	12	27	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.97	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.991			0.942			0.959	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	5085	1583	1770	5040	0	3433	3334	0	1770	3394	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	5085	1583	1770	5040	0	3433	3334	0	1770	3394	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			362		9			37			11	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		966			752			675			676	
Travel Time (s)		22.0			17.1			15.3			15.4	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	17	356	362	17	368	23	146	59	37	13	29	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	17	356	362	17	391	0	146	96	0	13	40	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									
Detector Phase	7	4	4	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	9.5	28.5	28.5	9.5	28.5		9.5	33.5		9.5	33.5	
Total Split (s)	14.0	50.0	50.0	14.0	50.0		20.0	44.0		12.0	36.0	
Total Split (%)	11.7%	41.7%	41.7%	11.7%	41.7%		16.7%	36.7%		10.0%	30.0%	
Maximum Green (s)	9.5	45.5	45.5	9.5	45.5		15.5	39.5		7.5	31.5	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Walk Time (s)		7.0	7.0		7.0			7.0			7.0	
Flash Dont Walk (s)		17.0	17.0		17.0			22.0			22.0	
Pedestrian Calls (#/hr)		0	0		0			0			0	
Act Effct Green (s)	6.5	10.8	10.8	6.5	10.8		7.8	14.0		6.4	6.5	
Actuated g/C Ratio	0.17	0.29	0.29	0.17	0.29		0.21	0.37		0.17	0.17	
v/c Ratio	0.06	0.25	0.51	0.06	0.27		0.21	0.08		0.04	0.07	
Control Delay	18.9	12.4	5.1	18.9	12.2		16.7	9.0		19.0	15.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	18.9	12.4	5.1	18.9	12.2		16.7	9.0		19.0	15.2	
LOS	B	B	A	B	B		B	A		B	B	
Approach Delay		9.0			12.5			13.7			16.2	
Approach LOS		A			B			B			B	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 37.8
Natural Cycle: 85
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.51
Intersection Signal Delay: 11.0 — Intersection LOS: B
Intersection Capacity Utilization 40.6% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 14: Leon Rd & Scott Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	141	1717	27	137	1737	10	33	0	115	12	5	221
Future Volume (vph)	141	1717	27	137	1737	10	33	0	115	12	5	221
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		210	0		0	200		200
Storage Lanes	1		0	1		1	1		0	1		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Frt		0.998				0.850		0.850				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	5075	0	1770	5085	1583	1770	1583	0	1770	1863	2787
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	5075	0	1770	5085	1583	1770	1583	0	1770	1863	2787
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				76		294				230
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1884			2845			958			1018	
Travel Time (s)		42.8			64.7			21.8			23.1	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	147	1789	28	143	1809	10	34	0	120	13	5	230
Shared Lane Traffic (%)												
Lane Group Flow (vph)	147	1817	0	143	1809	10	34	120	0	13	5	230
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						6

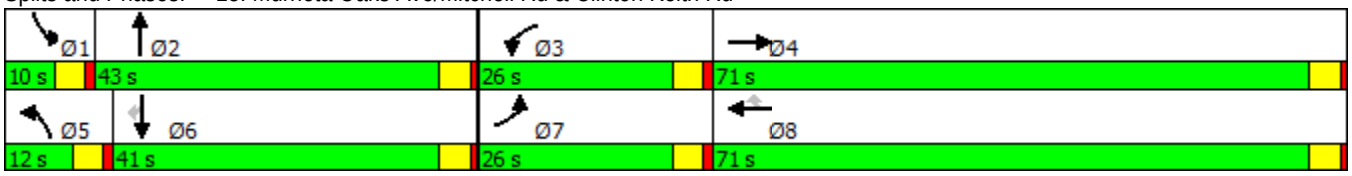
15: Murrieta Oaks Ave/Mitchell Rd & Clinton Keith Rd

Timing Plan: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	26.1		9.5	35.5	35.5	9.5	41.5		9.5	38.4	38.4
Total Split (s)	26.0	71.0		26.0	71.0	71.0	12.0	43.0		10.0	41.0	41.0
Total Split (%)	17.3%	47.3%		17.3%	47.3%	47.3%	8.0%	28.7%		6.7%	27.3%	27.3%
Maximum Green (s)	21.5	66.5		21.5	66.5	66.5	7.5	38.5		5.5	36.5	36.5
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	Max		None	Max	Max
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		14.6			24.0	24.0		30.0			26.9	26.9
Pedestrian Calls (#/hr)		0			0	0		0			0	0
Act Effct Green (s)	16.4	61.8		16.2	61.5	61.5	7.0	42.8		5.6	37.5	37.5
Actuated g/C Ratio	0.12	0.45		0.12	0.45	0.45	0.05	0.31		0.04	0.27	0.27
v/c Ratio	0.70	0.80		0.69	0.80	0.01	0.38	0.17		0.18	0.01	0.25
Control Delay	78.0	36.6		77.7	36.7	0.0	80.5	0.5		75.5	42.8	5.9
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	78.0	36.6		77.7	36.7	0.0	80.5	0.5		75.5	42.8	5.9
LOS	E	D		E	D	A	F	A		E	D	A
Approach Delay		39.7			39.5			18.2			10.3	
Approach LOS		D			D			B			B	

Intersection Summary	
Area Type:	Other
Cycle Length: 150	
Actuated Cycle Length: 138.2	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.80	
Intersection Signal Delay: 37.2	Intersection LOS: D
Intersection Capacity Utilization 61.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 15: Murrieta Oaks Ave/Mitchell Rd & Clinton Keith Rd

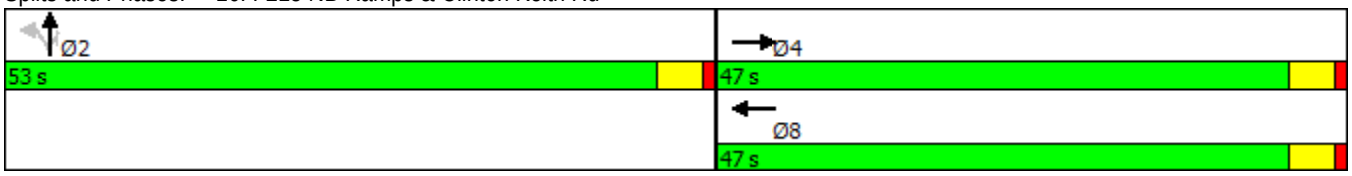


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1696	533	0	1682	93	528	0	599	0	0	0
Future Volume (vph)	0	1696	533	0	1682	93	528	0	599	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		160	0		0	0		0	0		0
Storage Lanes	0		1	0		1	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Frt			0.850			0.850		0.983	0.850			
Flt Protected								0.957				
Satd. Flow (prot)	0	5085	1583	0	5085	1583	0	1665	1504	0	0	0
Flt Permitted								0.957				
Satd. Flow (perm)	0	5085	1583	0	5085	1583	0	1665	1504	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			229			65		16	16			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2845			3447			1631			722	
Travel Time (s)		64.7			78.3			37.1			16.4	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	0	2043	642	0	2027	112	636	0	722	0	0	0
Shared Lane Traffic (%)									11%			
Lane Group Flow (vph)	0	2043	642	0	2027	112	0	715	643	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2	1		2	1	1	2	1			
Detector Template		Thru	Right		Thru	Right	Left	Thru	Right			
Leading Detector (ft)		100	20		100	20	20	100	20			
Trailing Detector (ft)		0	0		0	0	0	0	0			
Detector 1 Position(ft)		0	0		0	0	0	0	0			
Detector 1 Size(ft)		6	20		6	20	20	6	20			
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0			
Detector 1 Queue (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0			
Detector 1 Delay (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0			
Detector 2 Position(ft)		94			94			94				
Detector 2 Size(ft)		6			6			6				
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				
Turn Type		NA	Free		NA	Free	Perm	NA	Perm			
Protected Phases		4			8			2				
Permitted Phases			Free			Free	2		2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		4			8		2	2	2			
Switch Phase												
Minimum Initial (s)		5.0			5.0		5.0	5.0	5.0			
Minimum Split (s)		43.5			9.5		9.5	9.5	9.5			
Total Split (s)		47.0			47.0		53.0	53.0	53.0			
Total Split (%)		47.0%			47.0%		53.0%	53.0%	53.0%			
Maximum Green (s)		42.5			42.5		48.5	48.5	48.5			
Yellow Time (s)		3.5			3.5		3.5	3.5	3.5			
All-Red Time (s)		1.0			1.0		1.0	1.0	1.0			
Lost Time Adjust (s)		0.0			0.0			0.0	0.0			
Total Lost Time (s)		4.5			4.5			4.5	4.5			
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0			
Recall Mode		None			None		Max	Max	Max			
Walk Time (s)		7.0										
Flash Dont Walk (s)		32.0										
Pedestrian Calls (#/hr)		0										
Act Effct Green (s)		42.5	100.0		42.5	100.0		48.5	48.5			
Actuated g/C Ratio		0.42	1.00		0.42	1.00		0.48	0.48			
v/c Ratio		0.95	0.41		0.94	0.07		0.88	0.87			
Control Delay		38.4	0.8		37.4	0.1		36.6	37.3			
Queue Delay		0.0	0.0		0.0	0.0		0.0	0.0			
Total Delay		38.4	0.8		37.4	0.1		36.6	37.3			
LOS		D	A		D	A		D	D			
Approach Delay		29.4			35.5			36.9				
Approach LOS		C			D			D				

Intersection Summary	
Area Type: Other	
Cycle Length: 100	
Actuated Cycle Length: 100	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.95	
Intersection Signal Delay: 33.2	Intersection LOS: C
Intersection Capacity Utilization 81.7%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 16: I-215 NB Ramps & Clinton Keith Rd

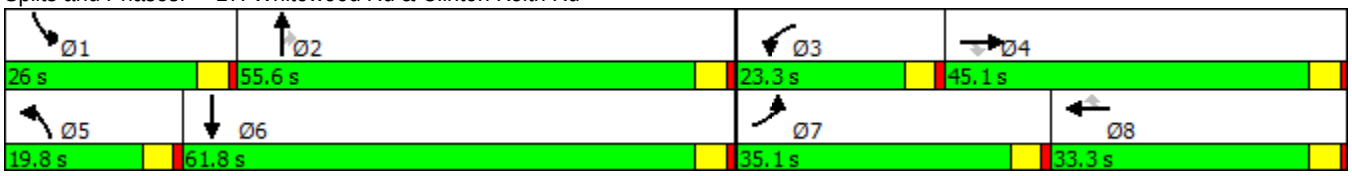


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	614	926	220	303	852	312	182	1008	231	426	532	272
Future Volume (vph)	614	926	220	303	852	312	182	1008	231	426	532	272
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	260		0	200		150	310		0	100		0
Storage Lanes	2		1	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	0.95
Frt			0.850			0.850			0.850		0.949	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3359	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3359	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			235			204			175		70	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3447			4370			3330			2871	
Travel Time (s)		78.3			99.3			75.7			65.3	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	714	1077	256	352	991	363	212	1172	269	495	619	316
Shared Lane Traffic (%)												
Lane Group Flow (vph)	714	1077	256	352	991	363	212	1172	269	495	935	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	29.2	29.2	29.2	9.5	9.5	9.5	9.5	46.4	46.4	9.5	43.5	
Total Split (s)	35.1	45.1	45.1	23.3	33.3	33.3	19.8	55.6	55.6	26.0	61.8	
Total Split (%)	23.4%	30.1%	30.1%	15.5%	22.2%	22.2%	13.2%	37.1%	37.1%	17.3%	41.2%	
Maximum Green (s)	30.6	40.6	40.6	18.8	28.8	28.8	15.3	51.1	51.1	21.5	57.3	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	
Walk Time (s)	7.0	7.0	7.0					7.0	7.0		7.0	
Flash Dont Walk (s)	17.7	17.7	17.7					34.9	34.9		32.0	
Pedestrian Calls (#/hr)	0	0	0					0	0		0	
Act Effct Green (s)	30.6	41.2	41.2	18.2	28.8	28.8	13.7	51.1	51.1	21.5	58.9	
Actuated g/C Ratio	0.20	0.27	0.27	0.12	0.19	0.19	0.09	0.34	0.34	0.14	0.39	
v/c Ratio	1.02	0.77	0.42	0.84	1.02	0.78	0.68	0.97	0.41	1.01	0.69	
Control Delay	97.0	54.7	9.0	82.9	91.7	37.0	76.9	68.6	14.9	105.0	38.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	97.0	54.7	9.0	82.9	91.7	37.0	76.9	68.6	14.9	105.0	38.2	
LOS	F	D	A	F	F	D	E	E	B	F	D	
Approach Delay		63.7			78.3			60.9			61.3	
Approach LOS		E			E			E			E	

Intersection Summary	
Area Type: Other	
Cycle Length: 150	
Actuated Cycle Length: 150	
Natural Cycle: 125	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.02	
Intersection Signal Delay: 66.2	Intersection LOS: E
Intersection Capacity Utilization 89.0%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 17: Whitewood Rd & Clinton Keith Rd

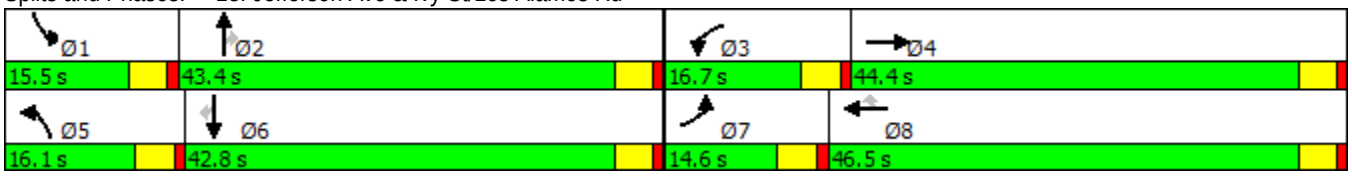


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	346	154	169	187	280	181	1619	500	291	914	41
Future Volume (vph)	130	346	154	169	187	280	181	1619	500	291	914	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		0	205		0	230		215	250		220
Storage Lanes	1		0	1		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt		0.954				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3376	0	1770	3539	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3376	0	1770	3539	1583	3433	5085	1583	3433	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		63				225			359			95
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1401			1395			2768			2782	
Travel Time (s)		31.8			31.7			62.9			63.2	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	134	357	159	174	193	289	187	1669	515	300	942	42
Shared Lane Traffic (%)												
Lane Group Flow (vph)	134	516	0	174	193	289	187	1669	515	300	942	42
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	44.4		9.5	44.4	44.4	9.5	38.4	38.4	9.5	34.4	34.4
Total Split (s)	14.6	44.4		16.7	46.5	46.5	16.1	43.4	43.4	15.5	42.8	42.8
Total Split (%)	12.2%	37.0%		13.9%	38.8%	38.8%	13.4%	36.2%	36.2%	12.9%	35.7%	35.7%
Maximum Green (s)	10.1	39.9		12.2	42.0	42.0	11.6	38.9	38.9	11.0	38.3	38.3
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		32.9			32.9	32.9		26.9	26.9		22.9	22.9
Pedestrian Calls (#/hr)		0			0	0		0	0		0	0
Act Effct Green (s)	10.1	19.3		12.2	21.4	21.4	10.2	39.0	39.0	11.0	39.8	39.8
Actuated g/C Ratio	0.10	0.19		0.12	0.21	0.21	0.10	0.39	0.39	0.11	0.40	0.40
v/c Ratio	0.75	0.73		0.80	0.25	0.56	0.53	0.84	0.61	0.79	0.46	0.06
Control Delay	70.2	39.3		70.9	32.9	13.0	48.9	32.9	11.1	60.0	23.8	0.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.2	39.3		70.9	32.9	13.0	48.9	32.9	11.1	60.0	23.8	0.2
LOS	E	D		E	C	B	D	C	B	E	C	A
Approach Delay		45.7			34.2			29.4			31.5	
Approach LOS		D			C			C			C	

Intersection Summary	
Area Type: Other	
Cycle Length: 120	
Actuated Cycle Length: 99.6	
Natural Cycle: 125	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 32.7	Intersection LOS: C
Intersection Capacity Utilization 78.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 18: Jefferson Ave & Ivy St/Los Alamos Rd

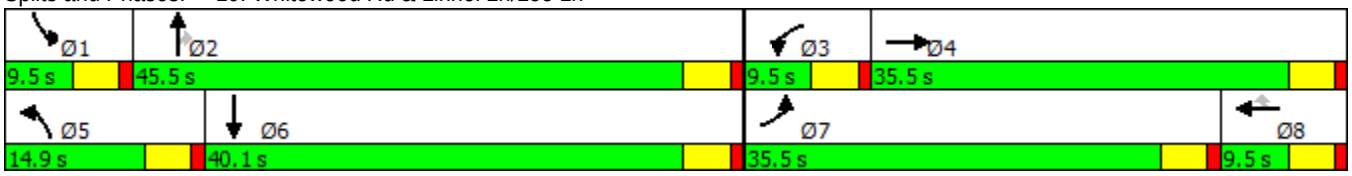


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	20	93	10	10	10	77	1089	10	10	566	84
Future Volume (vph)	115	20	93	10	10	10	77	1089	10	10	566	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	135		0	0		0	205		0	205		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.877				0.850			0.850		0.981	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3104	0	1770	3539	1583	1770	3539	1583	1770	3472	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3104	0	1770	3539	1583	1770	3539	1583	1770	3472	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		102				213			164		18	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1415			1455			2871			2884	
Travel Time (s)		32.2			33.1			65.3			65.5	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	126	22	102	11	11	11	85	1197	11	11	622	92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	126	124	0	11	11	11	85	1197	11	11	714	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	35.5	35.5		9.5	9.5	9.5	9.5	27.4	27.4	9.5	32.1	
Total Split (s)	35.5	35.5		9.5	9.5	9.5	14.9	45.5	45.5	9.5	40.1	
Total Split (%)	35.5%	35.5%		9.5%	9.5%	9.5%	14.9%	45.5%	45.5%	9.5%	40.1%	
Maximum Green (s)	31.0	31.0		5.0	5.0	5.0	10.4	41.0	41.0	5.0	35.6	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)	7.0	7.0						7.0	7.0		7.0	
Flash Dont Walk (s)	24.0	24.0						15.9	15.9		20.6	
Pedestrian Calls (#/hr)	0	0						0	0		0	
Act Effct Green (s)	10.6	12.4		5.1	5.1	5.1	8.5	49.4	49.4	5.1	40.2	
Actuated g/C Ratio	0.14	0.17		0.07	0.07	0.07	0.11	0.67	0.67	0.07	0.54	
v/c Ratio	0.50	0.21		0.09	0.05	0.04	0.42	0.51	0.01	0.09	0.38	
Control Delay	36.9	9.5		37.7	36.2	0.2	38.3	9.4	0.0	37.7	12.8	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	36.9	9.5		37.7	36.2	0.2	38.3	9.4	0.0	37.7	12.8	
LOS	D	A		D	D	A	D	A	A	D	B	
Approach Delay		23.3			24.7			11.3			13.2	
Approach LOS		C			C			B			B	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 74.2	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.51	
Intersection Signal Delay: 13.4	Intersection LOS: B
Intersection Capacity Utilization 58.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 19: Whitewood Rd & Linnel Ln/Lee Ln

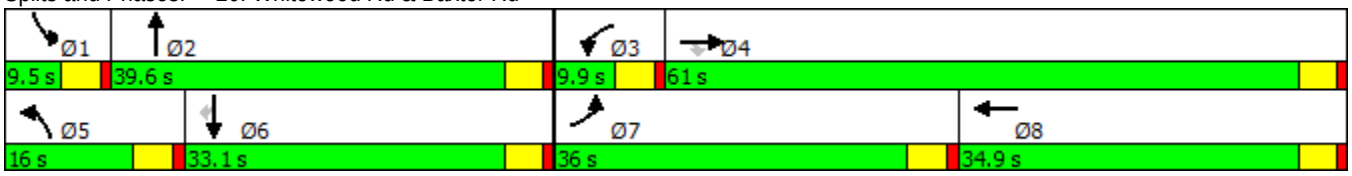


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	642	26	291	16	19	10	211	984	33	10	407	353
Future Volume (vph)	642	26	291	16	19	10	211	984	33	10	407	353
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	215		0	120		0	220		0	200		0
Storage Lanes	1		1	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850		0.948			0.995				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	3355	0	1770	3522	0	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1863	1583	1770	3355	0	1770	3522	0	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			316		11			3				384
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2823			874			2884			792	
Travel Time (s)		64.2			19.9			65.5			18.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	698	28	316	17	21	11	229	1070	36	11	442	384
Shared Lane Traffic (%)												
Lane Group Flow (vph)	698	28	316	17	32	0	229	1106	0	11	442	384
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	35.5	35.5	9.5	34.9		9.5	32.1		9.5	32.1	32.1
Total Split (s)	36.0	61.0	61.0	9.9	34.9		16.0	39.6		9.5	33.1	33.1
Total Split (%)	30.0%	50.8%	50.8%	8.3%	29.1%		13.3%	33.0%		7.9%	27.6%	27.6%
Maximum Green (s)	31.5	56.5	56.5	5.4	30.4		11.5	35.1		5.0	28.6	28.6
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	Max		None	Max	Max
Walk Time (s)		7.0	7.0		7.0			7.0			7.0	7.0
Flash Dont Walk (s)		24.0	24.0		23.4			20.6			20.6	20.6
Pedestrian Calls (#/hr)		0	0		0			0			0	0
Act Effct Green (s)	31.6	34.2	34.2	5.4	6.1		11.5	42.9		5.0	28.7	28.7
Actuated g/C Ratio	0.34	0.37	0.37	0.06	0.07		0.13	0.47		0.05	0.31	0.31
v/c Ratio	1.14	0.04	0.40	0.16	0.14		1.03	0.67		0.11	0.40	0.51
Control Delay	114.1	20.2	4.4	47.0	32.5		111.1	23.1		46.4	26.9	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	114.1	20.2	4.4	47.0	32.5		111.1	23.1		46.4	26.9	5.4
LOS	F	C	A	D	C		F	C		D	C	A
Approach Delay		78.3			37.5			38.2			17.3	
Approach LOS		E			D			D			B	

Intersection Summary	
Area Type: Other	
Cycle Length: 120	
Actuated Cycle Length: 91.7	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.14	
Intersection Signal Delay: 45.7	Intersection LOS: D
Intersection Capacity Utilization 85.9%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 20: Whitewood Rd & Baxter Rd



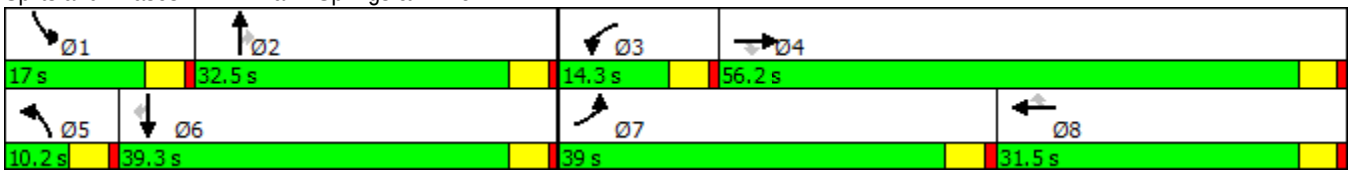
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	475	173	9	63	147	156	22	394	30	154	389	314
Future Volume (vph)	475	173	9	63	147	156	22	394	30	154	389	314
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			136			177			177			314
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		450			400			650			700	
Travel Time (s)		10.2			9.1			14.8			15.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	475	173	9	63	147	156	22	394	30	154	389	314
Shared Lane Traffic (%)												
Lane Group Flow (vph)	475	173	9	63	147	156	22	394	30	154	389	314
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	9.5	31.5	31.5	9.5	31.5	31.5	9.5	31.5	31.5	9.5	31.5	31.5
Total Split (s)	39.0	56.2	56.2	14.3	31.5	31.5	10.2	32.5	32.5	17.0	39.3	39.3
Total Split (%)	32.5%	46.8%	46.8%	11.9%	26.3%	26.3%	8.5%	27.1%	27.1%	14.2%	32.8%	32.8%
Maximum Green (s)	34.5	51.7	51.7	9.8	27.0	27.0	5.7	28.0	28.0	12.5	34.8	34.8
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		20.0	20.0		20.0	20.0		20.0	20.0		20.0	20.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	30.0	33.7	33.7	8.2	9.3	9.3	5.8	15.4	15.4	12.0	28.4	28.4
Actuated g/C Ratio	0.35	0.40	0.40	0.10	0.11	0.11	0.07	0.18	0.18	0.14	0.33	0.33
v/c Ratio	0.76	0.12	0.01	0.37	0.38	0.47	0.18	0.61	0.07	0.62	0.33	0.43
Control Delay	34.5	18.6	0.0	45.6	40.2	9.7	45.9	37.6	0.3	49.1	24.4	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.5	18.6	0.0	45.6	40.2	9.7	45.9	37.6	0.3	49.1	24.4	5.3
LOS	C	B	A	D	D	A	D	D	A	D	C	A
Approach Delay		29.9			28.1			35.5			21.9	
Approach LOS		C			C			D			C	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 85.1
Natural Cycle: 105
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 27.7 — Intersection LOS: C
Intersection Capacity Utilization 64.9% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 21: Warm Springs & Linnel Ln

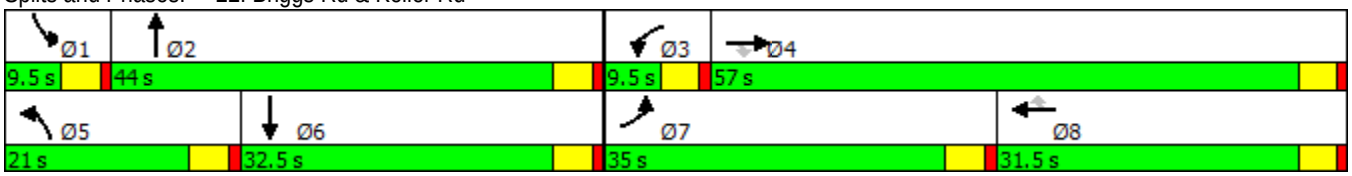


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	317	47	291	10	48	10	154	797	10	10	421	55
Future Volume (vph)	317	47	291	10	48	10	154	797	10	10	421	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.998			0.983	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	3532	0	1770	3479	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	3532	0	1770	3479	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			291			177		1			11	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		4817			1737			695			730	
Travel Time (s)		109.5			39.5			15.8			16.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	317	47	291	10	48	10	154	797	10	10	421	55
Shared Lane Traffic (%)												
Lane Group Flow (vph)	317	47	291	10	48	10	154	807	0	10	476	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Detector Phase	7	4	4	3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	9.5	31.5	31.5	9.5	31.5	31.5	9.5	31.5		9.5	31.5	
Total Split (s)	35.0	57.0	57.0	9.5	31.5	31.5	21.0	44.0		9.5	32.5	
Total Split (%)	29.2%	47.5%	47.5%	7.9%	26.3%	26.3%	17.5%	36.7%		7.9%	27.1%	
Maximum Green (s)	30.5	52.5	52.5	5.0	27.0	27.0	16.5	39.5		5.0	28.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)		7.0	7.0		7.0	7.0		7.0			7.0	
Flash Dont Walk (s)		20.0	20.0		20.0	20.0		20.0			20.0	
Pedestrian Calls (#/hr)		0	0		0	0		0			0	
Act Effct Green (s)	19.5	24.0	24.0	5.5	7.1	7.1	12.4	32.9		5.5	16.8	
Actuated g/C Ratio	0.28	0.35	0.35	0.08	0.10	0.10	0.18	0.47		0.08	0.24	
v/c Ratio	0.64	0.04	0.40	0.07	0.13	0.03	0.49	0.48		0.07	0.56	
Control Delay	31.1	17.1	4.5	41.3	36.9	0.2	36.5	16.5		41.3	27.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	31.1	17.1	4.5	41.3	36.9	0.2	36.5	16.5		41.3	27.7	
LOS	C	B	A	D	D	A	D	B		D	C	
Approach Delay		18.3			32.2			19.7			28.0	
Approach LOS		B			C			B			C	

Intersection Summary	
Area Type: Other	
Cycle Length: 120	
Actuated Cycle Length: 69.5	
Natural Cycle: 95	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.64	
Intersection Signal Delay: 21.5	Intersection LOS: C
Intersection Capacity Utilization 62.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 22: Briggs Rd & Keller Rd

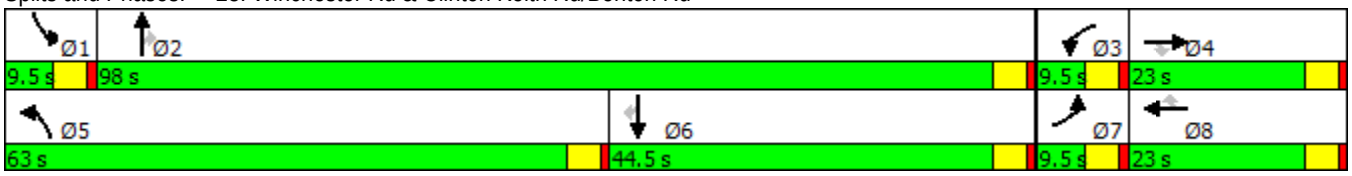


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	312	828	10	323	10	1300	2289	180	10	1287	10
Future Volume (vph)	10	312	828	10	323	10	1300	2289	180	10	1287	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		150	0		0	0		0	0		0
Storage Lanes	2		2	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.88	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	2787	3433	3539	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3539	2787	3433	3539	1583	3433	5085	1583	3433	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			828			117			180			117
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		4370			1699			998			766	
Travel Time (s)		99.3			38.6			22.7			17.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	10	312	828	10	323	10	1300	2289	180	10	1287	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	10	312	828	10	323	10	1300	2289	180	10	1287	10
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	9.5	23.0	23.0	9.5	23.0	23.0	63.0	98.0	98.0	9.5	44.5	44.5
Total Split (%)	6.8%	16.4%	16.4%	6.8%	16.4%	16.4%	45.0%	70.0%	70.0%	6.8%	31.8%	31.8%
Maximum Green (s)	5.0	18.5	18.5	5.0	18.5	18.5	58.5	93.5	93.5	5.0	40.0	40.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	5.0	17.7	17.7	5.0	17.7	17.7	52.7	97.1	97.1	5.0	41.6	41.6
Actuated g/C Ratio	0.04	0.14	0.14	0.04	0.14	0.14	0.41	0.76	0.76	0.04	0.33	0.33
v/c Ratio	0.07	0.63	0.75	0.07	0.66	0.03	0.92	0.59	0.14	0.07	0.77	0.02
Control Delay	63.9	59.1	8.4	63.9	59.8	0.2	46.1	8.2	1.2	63.9	43.8	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.9	59.1	8.4	63.9	59.8	0.2	46.1	8.2	1.2	63.9	43.8	0.1
LOS	E	E	A	E	E	A	D	A	A	E	D	A
Approach Delay		22.6			58.2			20.9			43.6	
Approach LOS		C			E			C			D	

Intersection Summary	
Area Type: Other	
Cycle Length: 140	
Actuated Cycle Length: 127.3	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.92	
Intersection Signal Delay: 27.7	Intersection LOS: C
Intersection Capacity Utilization 82.1%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 23: Winchester Rd & Clinton Keith Rd/Benton Rd



FUTURE YEAR 2035 WITH PROJECT CONDITIONS

1: Jefferson Ave & Murrieta Hot Springs Rd

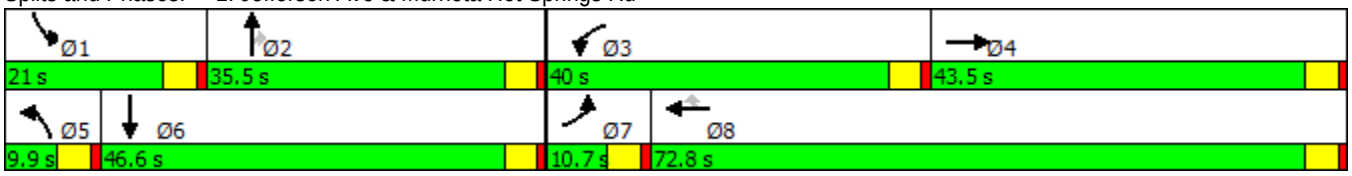
Timing Plan: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	67	12	973	87	299	13	455	253	814	985	10
Future Volume (vph)	23	67	12	973	87	299	13	455	253	814	985	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		265	0		280	185		0
Storage Lanes	1		0	1		1	1		2	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	0.91	0.88	0.97	0.91	0.91
Frt		0.977				0.850			0.850		0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	4968	0	1770	5085	1583	1770	5085	2787	3433	5075	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	4968	0	1770	5085	1583	1770	5085	2787	3433	5075	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13				325			275		1	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		687			1412			1630			2768	
Travel Time (s)		15.6			32.1			37.0			62.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	25	73	13	1058	95	325	14	495	275	885	1071	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	25	86	0	1058	95	325	14	495	275	885	1082	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		36			36			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	43.5		9.5	44.4	44.4	9.5	33.8	33.8	9.5	22.5	
Total Split (s)	10.7	43.5		40.0	72.8	72.8	9.9	35.5	35.5	21.0	46.6	
Total Split (%)	7.6%	31.1%		28.6%	52.0%	52.0%	7.1%	25.4%	25.4%	15.0%	33.3%	
Maximum Green (s)	6.2	39.0		35.5	68.3	68.3	5.4	31.0	31.0	16.5	42.1	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0		7.0	7.0			
Flash Dont Walk (s)		32.0			32.9	32.9		22.3	22.3			
Pedestrian Calls (#/hr)		0			0	0		0	0			
Act Effct Green (s)	6.1	7.0		35.5	40.6	40.6	5.4	31.0	31.0	16.5	48.1	
Actuated g/C Ratio	0.06	0.06		0.33	0.38	0.38	0.05	0.29	0.29	0.15	0.45	
v/c Ratio	0.25	0.26		1.82	0.05	0.41	0.16	0.34	0.28	1.69	0.48	
Control Delay	55.6	42.6		401.7	23.1	4.5	53.8	31.3	4.3	348.7	22.8	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	55.6	42.6		401.7	23.1	4.5	53.8	31.3	4.3	348.7	22.8	
LOS	E	D		F	C	A	D	C	A	F	C	
Approach Delay		45.5			290.0			22.3			169.5	
Approach LOS		D			F			C			F	

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 108	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.82	
Intersection Signal Delay: 180.8	Intersection LOS: F
Intersection Capacity Utilization 103.8%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 1: Jefferson Ave & Murrieta Hot Springs Rd

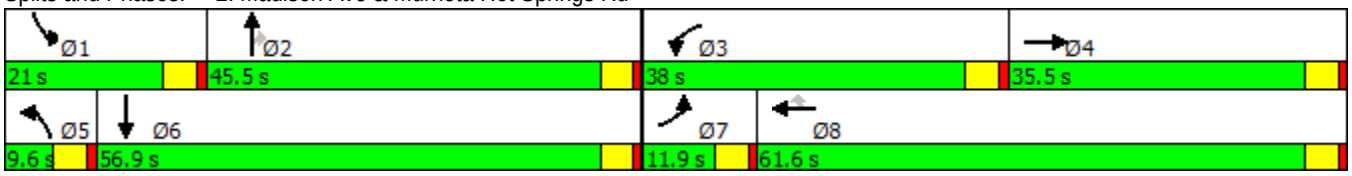


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	858	148	718	1012	337	50	218	266	350	465	537
Future Volume (vph)	77	858	148	718	1012	337	50	218	266	350	465	537
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	250		0	100		100	165		0
Storage Lanes	2		0	2		1	2		2	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.86	0.86	0.97	0.91	1.00	0.97	0.95	0.88	0.97	0.95	0.95
Frt		0.978				0.850			0.850		0.920	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	6267	0	3433	5085	1583	3433	3539	2787	3433	3256	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	6267	0	3433	5085	1583	3433	3539	2787	3433	3256	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		29				379			299		155	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1412			2198			1707			1381	
Travel Time (s)		32.1			50.0			38.8			31.4	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	87	964	166	807	1137	379	56	245	299	393	522	603
Shared Lane Traffic (%)												
Lane Group Flow (vph)	87	1130	0	807	1137	379	56	245	299	393	1125	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	35.5		9.5	38.4	38.4	9.5	45.2	45.2	9.5	45.2	
Total Split (s)	11.9	35.5		38.0	61.6	61.6	9.6	45.5	45.5	21.0	56.9	
Total Split (%)	8.5%	25.4%		27.1%	44.0%	44.0%	6.9%	32.5%	32.5%	15.0%	40.6%	
Maximum Green (s)	7.4	31.0		33.5	57.1	57.1	5.1	41.0	41.0	16.5	52.4	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		24.0			26.9	26.9		33.7	33.7		33.7	
Pedestrian Calls (#/hr)		0			0	0		0	0		0	
Act Effct Green (s)	7.2	30.4		33.5	56.7	56.7	5.1	41.0	41.0	16.5	54.4	
Actuated g/C Ratio	0.05	0.22		0.24	0.41	0.41	0.04	0.29	0.29	0.12	0.39	
v/c Ratio	0.49	0.81		0.98	0.55	0.44	0.45	0.24	0.29	0.97	0.82	
Control Delay	74.1	56.0		78.9	32.9	4.1	77.5	38.2	4.6	98.0	39.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	74.1	56.0		78.9	32.9	4.1	77.5	38.2	4.6	98.0	39.4	
LOS	E	E		E	C	A	E	D	A	F	D	
Approach Delay		57.3			44.2			25.1			54.6	
Approach LOS		E			D			C			D	

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 139.4	
Natural Cycle: 135	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.98	
Intersection Signal Delay: 47.8	Intersection LOS: D
Intersection Capacity Utilization 84.7%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 2: Madison Ave & Murrieta Hot Springs Rd

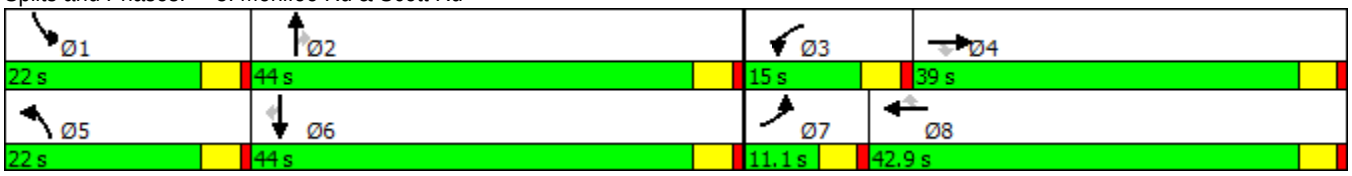


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	495	77	143	566	176	131	220	132	133	767	87
Future Volume (vph)	77	495	77	143	566	176	131	220	132	133	767	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	195		0	155		0	150		0
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	1770	3539	1583	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			95			178			133			95
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		804			428			403			545	
Travel Time (s)		18.3			9.7			9.2			12.4	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	78	500	78	144	572	178	132	222	133	134	775	88
Shared Lane Traffic (%)												
Lane Group Flow (vph)	78	500	78	144	572	178	132	222	133	134	775	88
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	38.6	38.6	9.5	9.5	9.5	9.5	9.5	9.5	9.5	36.6	36.6
Total Split (s)	11.1	39.0	39.0	15.0	42.9	42.9	22.0	44.0	44.0	22.0	44.0	44.0
Total Split (%)	9.3%	32.5%	32.5%	12.5%	35.8%	35.8%	18.3%	36.7%	36.7%	18.3%	36.7%	36.7%
Maximum Green (s)	6.6	34.5	34.5	10.5	38.4	38.4	17.5	39.5	39.5	17.5	39.5	39.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)		7.0	7.0								7.0	7.0
Flash Dont Walk (s)		27.1	27.1								25.1	25.1
Pedestrian Calls (#/hr)		0	0								0	0
Act Effct Green (s)	6.5	16.0	16.0	9.1	21.0	21.0	12.3	39.8	39.8	12.4	39.9	39.9
Actuated g/C Ratio	0.07	0.17	0.17	0.10	0.22	0.22	0.13	0.42	0.42	0.13	0.42	0.42
v/c Ratio	0.34	0.59	0.23	0.44	0.51	0.37	0.58	0.15	0.18	0.58	0.52	0.12
Control Delay	49.2	40.0	7.1	46.8	35.5	7.4	50.5	19.3	4.6	50.6	23.6	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.2	40.0	7.1	46.8	35.5	7.4	50.5	19.3	4.6	50.6	23.6	4.6
LOS	D	D	A	D	D	A	D	B	A	D	C	A
Approach Delay		37.2			31.7			23.7			25.6	
Approach LOS		D			C			C			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 95.4	
Natural Cycle: 95	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.59	
Intersection Signal Delay: 29.6	Intersection LOS: C
Intersection Capacity Utilization 58.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Menifee Rd & Scott Rd



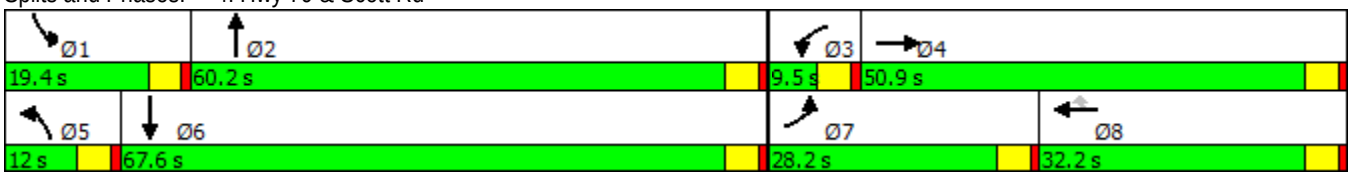
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	104	104	10	71	187	99	1637	10	264	2371	151
Future Volume (vph)	165	104	104	10	71	187	99	1637	10	264	2371	151
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	0.91	0.91	0.97	0.91	0.91
Frt		0.925				0.850		0.999			0.991	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	4704	0	1770	5085	1583	1770	5080	0	3433	5040	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	4704	0	1770	5085	1583	1770	5080	0	3433	5040	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		113				196		1			9	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1266			804			669			738	
Travel Time (s)		28.8			18.3			15.2			16.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	179	113	113	11	77	203	108	1779	11	287	2577	164
Shared Lane Traffic (%)												
Lane Group Flow (vph)	179	226	0	11	77	203	108	1790	0	287	2741	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Detector Phase	7	4		3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	9.5	50.9		9.5	9.5	9.5	9.5	41.9		9.5	49.8	
Total Split (s)	28.2	50.9		9.5	32.2	32.2	12.0	60.2		19.4	67.6	
Total Split (%)	20.1%	36.4%		6.8%	23.0%	23.0%	8.6%	43.0%		13.9%	48.3%	
Maximum Green (s)	23.7	46.4		5.0	27.7	27.7	7.5	55.7		14.9	63.1	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max		None	Max	
Walk Time (s)		7.0						7.0			7.0	
Flash Dont Walk (s)		39.4						30.4			38.3	
Pedestrian Calls (#/hr)		0						0			0	
Act Effct Green (s)	16.7	27.9		5.0	8.5	8.5	7.5	57.1		13.8	63.4	
Actuated g/C Ratio	0.15	0.24		0.04	0.07	0.07	0.07	0.50		0.12	0.56	
v/c Ratio	0.69	0.18		0.14	0.20	0.68	0.93	0.70		0.69	0.98	
Control Delay	61.1	17.0		60.2	51.5	20.2	120.6	25.2		58.5	38.3	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	61.1	17.0		60.2	51.5	20.2	120.6	25.2		58.5	38.3	
LOS	E	B		E	D	C	F	C		E	D	
Approach Delay		36.5			30.0			30.6			40.2	
Approach LOS		D			C			C			D	

Intersection Summary

Area Type: Other
Cycle Length: 140
Actuated Cycle Length: 114.1
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.98
Intersection Signal Delay: 36.2 — Intersection LOS: D
Intersection Capacity Utilization 81.7% — ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 4: Hwy 79 & Scott Rd

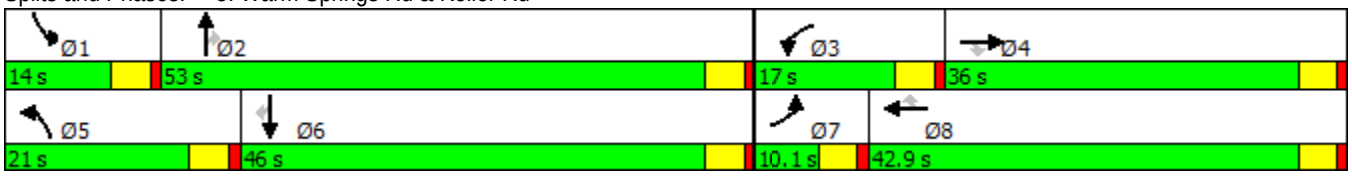


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	180	397	71	931	55	249	110	41	44	302	369
Future Volume (vph)	59	180	397	71	931	55	249	110	41	44	302	369
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	120		0	195		0	110		110	120		0
Storage Lanes	2		1	1		1	2		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	3433	3539	1583	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	1770	5085	1583	3433	3539	1583	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			422			136			136			177
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1361			4817			5440			744	
Travel Time (s)		30.9			109.5			123.6			16.9	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	63	191	422	76	990	59	265	117	44	47	321	393
Shared Lane Traffic (%)												
Lane Group Flow (vph)	63	191	422	76	990	59	265	117	44	47	321	393
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	29.2	29.2	9.5	26.9	26.9	9.5	30.9	30.9	9.5	29.2	29.2
Total Split (s)	10.1	36.0	36.0	17.0	42.9	42.9	21.0	53.0	53.0	14.0	46.0	46.0
Total Split (%)	8.4%	30.0%	30.0%	14.2%	35.8%	35.8%	17.5%	44.2%	44.2%	11.7%	38.3%	38.3%
Maximum Green (s)	5.6	31.5	31.5	12.5	38.4	38.4	16.5	48.5	48.5	9.5	41.5	41.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		17.7	17.7		15.4	15.4		19.4	19.4		17.7	17.7
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	5.7	26.0	26.0	9.7	29.8	29.8	13.3	50.9	50.9	7.9	43.0	43.0
Actuated g/C Ratio	0.05	0.24	0.24	0.09	0.28	0.28	0.12	0.47	0.47	0.07	0.40	0.40
v/c Ratio	0.35	0.16	0.60	0.48	0.70	0.11	0.62	0.07	0.05	0.36	0.23	0.53
Control Delay	58.7	33.7	7.4	59.5	38.0	0.4	53.0	19.4	0.1	58.8	24.1	17.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.7	33.7	7.4	59.5	38.0	0.4	53.0	19.4	0.1	58.8	24.1	17.8
LOS	E	C	A	E	D	A	D	B	A	E	C	B
Approach Delay		19.6			37.5			38.3			23.0	
Approach LOS		B			D			D			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 107.5	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 29.9	Intersection LOS: C
Intersection Capacity Utilization 59.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 5: Warm Springs Rd & Keller Rd

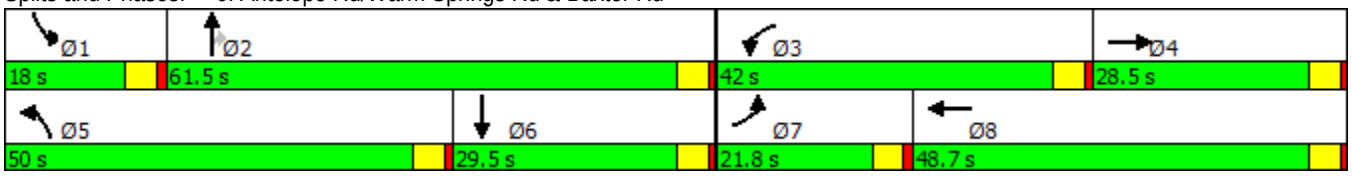


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	108	123	142	443	375	37	538	172	121	83	218	288
Future Volume (vph)	108	123	142	443	375	37	538	172	121	83	218	288
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		20	150		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.920			0.987				0.850		0.915	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3256	0	1770	3493	0	1770	3539	1583	1770	3238	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3256	0	1770	3493	0	1770	3539	1583	1770	3238	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		142			7				109		193	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		620			2823			806			5440	
Travel Time (s)		14.1			64.2			18.3			123.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	108	123	142	443	375	37	538	172	121	83	218	288
Shared Lane Traffic (%)												
Lane Group Flow (vph)	108	265	0	443	412	0	538	172	121	83	506	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	28.5		9.5	28.5		9.5	34.9	34.9	9.5	28.5	
Total Split (s)	21.8	28.5		42.0	48.7		50.0	61.5	61.5	18.0	29.5	
Total Split (%)	14.5%	19.0%		28.0%	32.5%		33.3%	41.0%	41.0%	12.0%	19.7%	
Maximum Green (s)	17.3	24.0		37.5	44.2		45.5	57.0	57.0	13.5	25.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0			7.0	7.0		7.0	
Flash Dont Walk (s)		17.0			17.0			17.0	17.0		17.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effct Green (s)	13.3	10.7		37.5	35.0		45.5	59.4	59.4	11.1	25.0	
Actuated g/C Ratio	0.10	0.08		0.27	0.26		0.33	0.43	0.43	0.08	0.18	
v/c Ratio	0.63	0.69		0.91	0.46		0.91	0.11	0.16	0.58	0.68	
Control Delay	75.8	37.5		72.8	44.5		65.5	24.4	6.3	76.9	37.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	75.8	37.5		72.8	44.5		65.5	24.4	6.3	76.9	37.1	
LOS	E	D		E	D		E	C	A	E	D	
Approach Delay		48.6			59.2			48.3			42.7	
Approach LOS		D			E			D			D	

Intersection Summary	
Area Type: Other	
Cycle Length: 150	
Actuated Cycle Length: 136.8	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 50.6	Intersection LOS: D
Intersection Capacity Utilization 92.6%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 6: Antelope Rd/Warm Springs Rd & Baxter Rd

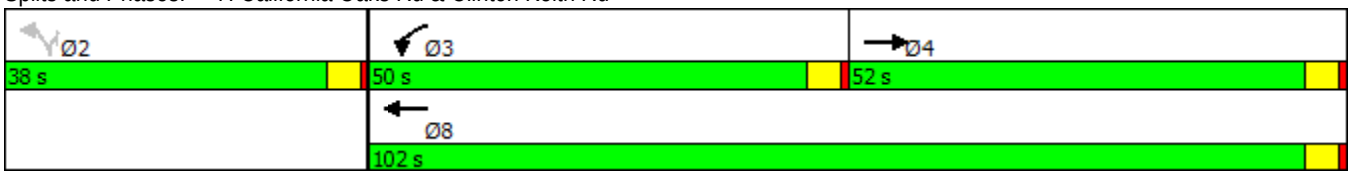


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1535	319	627	1121	243	627
Future Volume (vph)	1535	319	627	1121	243	627
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	225		100	0
Storage Lanes		0	1		1	2
Taper Length (ft)			25		25	
Lane Util. Factor	0.91	0.91	1.00	0.91	1.00	0.88
Frt	0.974					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	4953	0	1770	5085	1770	2787
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	4953	0	1770	5085	1770	2787
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	35					660
Link Speed (mph)	30			30	30	
Link Distance (ft)	2233			3569	625	
Travel Time (s)	50.8			81.1	14.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1616	336	660	1180	256	660
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1952	0	660	1180	256	660
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Number of Detectors	2		1	2	1	1
Detector Template	Thru		Left	Thru	Left	Right
Leading Detector (ft)	100		20	100	20	20
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	6		20	6	20	20
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Prot	NA	Perm	Perm
Protected Phases	4		3	8		
Permitted Phases					2	2

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	4		3	8	2	2
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0
Minimum Split (s)	36.6		9.5	9.5	37.2	37.2
Total Split (s)	52.0		50.0	102.0	38.0	38.0
Total Split (%)	37.1%		35.7%	72.9%	27.1%	27.1%
Maximum Green (s)	47.5		45.5	97.5	33.5	33.5
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5		4.5	4.5	4.5	4.5
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	None	Max	Max
Walk Time (s)	7.0				7.0	7.0
Flash Dont Walk (s)	25.1				25.7	25.7
Pedestrian Calls (#/hr)	0				0	0
Act Effct Green (s)	47.5		45.5	97.5	33.5	33.5
Actuated g/C Ratio	0.34		0.32	0.70	0.24	0.24
v/c Ratio	1.15		1.15	0.33	0.61	0.57
Control Delay	114.3		127.9	8.7	54.4	5.1
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	114.3		127.9	8.7	54.4	5.1
LOS	F		F	A	D	A
Approach Delay	114.3			51.5	18.8	
Approach LOS	F			D	B	

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 140	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.15	
Intersection Signal Delay: 71.2	Intersection LOS: E
Intersection Capacity Utilization 96.2%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 7: California Oaks Rd & Clinton Keith Rd



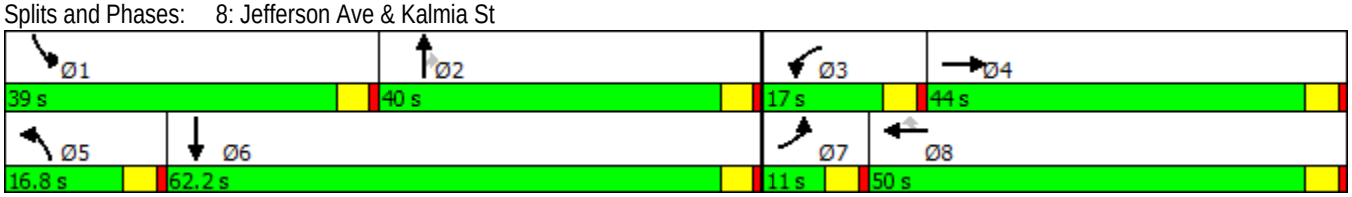
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	759	742	220	627	241	154	535	144	688	1141	49
Future Volume (vph)	26	759	742	220	627	241	154	535	144	688	1141	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		140	235		0	205		0	145		0
Storage Lanes	1		0	1		1	2		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.95	1.00	0.97	0.91	1.00	1.00	0.91	0.91
Frt		0.926				0.850			0.850		0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	4709	0	1770	3539	1583	3433	5085	1583	1770	5055	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	4709	0	1770	3539	1583	3433	5085	1583	1770	5055	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		176				265			152		6	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1399			684			2782			1004	
Travel Time (s)		31.8			15.5			63.2			22.8	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	29	834	815	242	689	265	169	588	158	756	1254	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	1649	0	242	689	265	169	588	158	756	1308	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	44.0		9.5	34.9	34.9	9.5	38.6	38.6	9.5	39.5	
Total Split (s)	11.0	44.0		17.0	50.0	50.0	16.8	40.0	40.0	39.0	62.2	
Total Split (%)	7.9%	31.4%		12.1%	35.7%	35.7%	12.0%	28.6%	28.6%	27.9%	44.4%	
Maximum Green (s)	6.5	39.5		12.5	45.5	45.5	12.3	35.5	35.5	34.5	57.7	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		32.5			23.4	23.4		27.1	27.1		28.0	
Pedestrian Calls (#/hr)		0			0	0		0	0		0	
Act Effct Green (s)	6.3	39.5		12.5	49.9	49.9	11.3	35.5	35.5	34.5	58.7	
Actuated g/C Ratio	0.04	0.28		0.09	0.36	0.36	0.08	0.25	0.25	0.25	0.42	
v/c Ratio	0.37	1.42dr		1.53	0.55	0.36	0.61	0.46	0.31	1.73	0.62	
Control Delay	77.8	110.0		309.2	38.9	5.2	72.0	45.5	8.5	371.9	33.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	77.8	110.0		309.2	38.9	5.2	72.0	45.5	8.5	371.9	33.4	
LOS	E	F		F	D	A	E	D	A	F	C	
Approach Delay		109.4			86.1			44.0			157.4	
Approach LOS		F			F			D			F	

Intersection Summary	
Area Type: Other	
Cycle Length: 140	
Actuated Cycle Length: 140	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.73	
Intersection Signal Delay: 111.3	Intersection LOS: F
Intersection Capacity Utilization 107.0%	ICU Level of Service G
Analysis Period (min) 15	

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 8: Jefferson Ave & Kalmia St

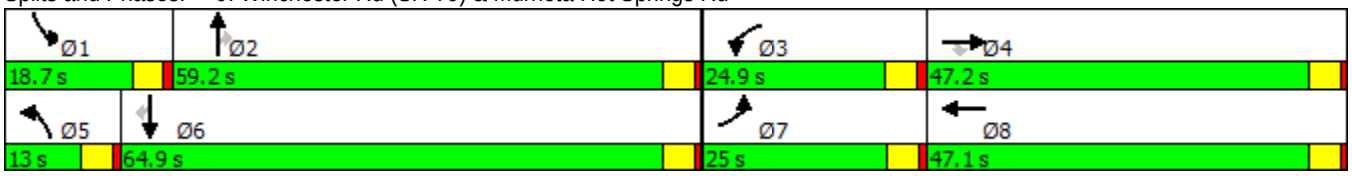


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	996	740	190	297	925	243	308	867	148	187	1710	1238
Future Volume (vph)	996	740	190	297	925	243	308	867	148	187	1710	1238
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	195		200	195		200	205		0	210		0
Storage Lanes	2		1	2		0	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	0.91	0.97	0.91	1.00	0.97	0.91	1.00
Frt			0.850		0.969				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	3433	4928	0	3433	5085	1583	3433	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	4928	0	3433	5085	1583	3433	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			124		44				153			318
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1422			1339			680			585	
Travel Time (s)		32.3			30.4			15.5			13.3	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1027	763	196	306	954	251	318	894	153	193	1763	1276
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1027	763	196	306	1205	0	318	894	153	193	1763	1276
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4						2			6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	9.5	9.5	9.5	47.1		9.5	44.4	44.4	9.5	44.9	44.9
Total Split (s)	25.0	47.2	47.2	24.9	47.1		13.0	59.2	59.2	18.7	64.9	64.9
Total Split (%)	16.7%	31.5%	31.5%	16.6%	31.4%		8.7%	39.5%	39.5%	12.5%	43.3%	43.3%
Maximum Green (s)	20.5	42.7	42.7	20.4	42.6		8.5	54.7	54.7	14.2	60.4	60.4
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	Max	Max	None	Max	Max
Walk Time (s)					7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)					35.6			32.9	32.9		33.4	33.4
Pedestrian Calls (#/hr)					0			0	0		0	0
Act Effct Green (s)	20.5	43.8	43.8	17.9	41.1		8.5	56.1	56.1	12.8	60.4	60.4
Actuated g/C Ratio	0.14	0.29	0.29	0.12	0.28		0.06	0.38	0.38	0.09	0.41	0.41
v/c Ratio	2.17	0.51	0.35	0.74	0.86		1.62	0.47	0.22	0.65	0.85	1.53
Control Delay	561.7	45.2	17.6	74.6	56.5		343.8	36.3	5.3	76.8	45.3	271.4
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	561.7	45.2	17.6	74.6	56.5		343.8	36.3	5.3	76.8	45.3	271.4
LOS	F	D	B	E	E		F	D	A	E	D	F
Approach Delay		309.6			60.2			104.5			136.4	
Approach LOS		F			E			F			F	

Intersection Summary	
Area Type: Other	
Cycle Length: 150	
Actuated Cycle Length: 148.6	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 2.17	
Intersection Signal Delay: 159.3	Intersection LOS: F
Intersection Capacity Utilization 120.0%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 9: Winchester Rd (SR-79) & Murrieta Hot Springs Rd

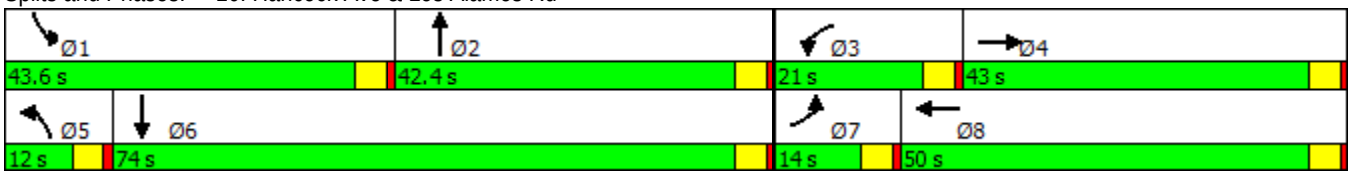


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	126	910	82	249	1034	203	93	143	189	727	831	195
Future Volume (vph)	126	910	82	249	1034	203	93	143	189	727	831	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	100		0	100		0	225		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	0.97	1.00	1.00
Frt		0.988			0.975			0.915			0.971	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3497	0	1770	3451	0	1770	3238	0	3433	1809	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3497	0	1770	3451	0	1770	3238	0	3433	1809	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			16			163			10	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		440			1059			599			686	
Travel Time (s)		10.0			24.1			13.6			15.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	137	989	89	271	1124	221	101	155	205	790	903	212
Shared Lane Traffic (%)												
Lane Group Flow (vph)	137	1078	0	271	1345	0	101	360	0	790	1115	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	36.4		9.5	36.4		9.5	36.9		9.5	36.4	
Total Split (s)	14.0	43.0		21.0	50.0		12.0	42.4		43.6	74.0	
Total Split (%)	9.3%	28.7%		14.0%	33.3%		8.0%	28.3%		29.1%	49.3%	
Maximum Green (s)	9.5	38.5		16.5	45.5		7.5	37.9		39.1	69.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Max		None	Max	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		24.9			24.9			25.4			24.9	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	9.5	38.5		16.5	45.5		7.5	39.4		37.6	69.5	
Actuated g/C Ratio	0.06	0.26		0.11	0.30		0.05	0.26		0.25	0.46	
v/c Ratio	1.22	1.20		1.40	1.27		1.15	0.37		0.92	1.32	
Control Delay	211.9	145.6		253.0	172.0		200.6	25.6		70.9	187.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	211.9	145.6		253.0	172.0		200.6	25.6		70.9	187.3	
LOS	F	F		F	F		F	C		E	F	
Approach Delay		153.0			185.6			63.9			139.0	
Approach LOS		F			F			E			F	

Intersection Summary	
Area Type:	Other
Cycle Length: 150	
Actuated Cycle Length: 150	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.40	
Intersection Signal Delay: 150.1	Intersection LOS: F
Intersection Capacity Utilization 117.8%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 10: Hancock Ave & Los Alamos Rd

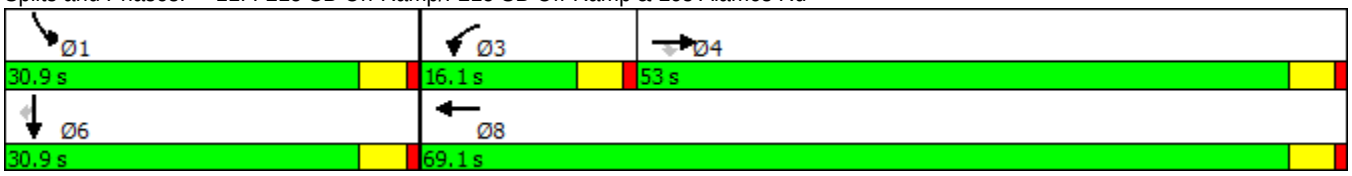


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1565	396	342	1006	0	0	0	0	159	5	796
Future Volume (vph)	0	1565	396	342	1006	0	0	0	0	159	5	796
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		95	100		0	0		0	305		305
Storage Lanes	0		1	2		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	0.95	0.91	0.95
Frt			0.850								0.857	0.850
Flt Protected				0.950						0.950	0.998	
Satd. Flow (prot)	0	3539	1583	3433	3539	0	0	0	0	1681	1450	1504
Flt Permitted				0.950						0.950	0.998	
Satd. Flow (perm)	0	3539	1583	3433	3539	0	0	0	0	1681	1450	1504
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			161								131	131
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1059			394			642			451	
Travel Time (s)		24.1			9.0			14.6			10.3	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	1613	408	353	1037	0	0	0	0	164	5	821
Shared Lane Traffic (%)										10%		49%
Lane Group Flow (vph)	0	1613	408	353	1037	0	0	0	0	148	423	419
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2	1	1	2					1	2	1
Detector Template		Thru	Right	Left	Thru					Left	Thru	Right
Leading Detector (ft)		100	20	20	100					20	100	20
Trailing Detector (ft)		0	0	0	0					0	0	0
Detector 1 Position(ft)		0	0	0	0					0	0	0
Detector 1 Size(ft)		6	20	20	6					20	6	20
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Detector 2 Position(ft)		94			94						94	
Detector 2 Size(ft)		6			6						6	
Detector 2 Type		Cl+Ex			Cl+Ex						Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0						0.0	
Turn Type		NA	Perm	Prot	NA					Prot	NA	Perm
Protected Phases		4		3	8					1	6	
Permitted Phases			4									6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		4	4	3	8					1	6	6
Switch Phase												
Minimum Initial (s)		5.0	5.0	5.0	5.0					5.0	5.0	5.0
Minimum Split (s)		34.6	34.6	9.5	28.4					9.5	9.5	9.5
Total Split (s)		53.0	53.0	16.1	69.1					30.9	30.9	30.9
Total Split (%)		53.0%	53.0%	16.1%	69.1%					30.9%	30.9%	30.9%
Maximum Green (s)		48.5	48.5	11.6	64.6					26.4	26.4	26.4
Yellow Time (s)		3.5	3.5	3.5	3.5					3.5	3.5	3.5
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Lost Time (s)		4.5	4.5	4.5	4.5					4.5	4.5	4.5
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		None	None	None	None					None	Max	Max
Walk Time (s)		7.0	7.0		7.0							
Flash Dont Walk (s)		23.1	23.1		16.9							
Pedestrian Calls (#/hr)		0	0		0							
Act Effct Green (s)		48.5	48.5	11.6	64.6					26.4	26.4	26.4
Actuated g/C Ratio		0.48	0.48	0.12	0.65					0.26	0.26	0.26
v/c Ratio		0.94	0.48	0.89	0.45					0.33	0.88	0.85
Control Delay		36.6	12.1	68.6	9.6					32.3	45.9	41.5
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Delay		36.6	12.1	68.6	9.6					32.3	45.9	41.5
LOS		D	B	E	A					C	D	D
Approach Delay		31.7			24.6						42.0	
Approach LOS		C			C						D	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay: 31.8	Intersection LOS: C
Intersection Capacity Utilization 77.0%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 11: I-215 SB On-Ramp/I-215 SB Off-Ramp & Los Alamos Rd

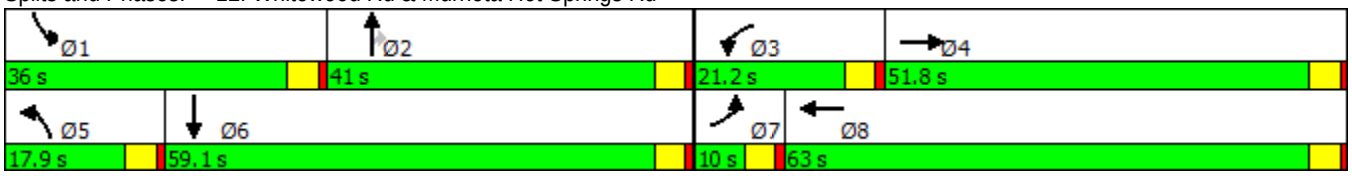


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	1585	51	190	2071	269	76	63	59	462	443	155
Future Volume (vph)	65	1585	51	190	2071	269	76	63	59	462	443	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	215		0	150		0	150		0	225		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.995			0.983				0.850		0.961	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	5060	0	1770	4999	0	1770	3539	1583	1770	3401	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	5060	0	1770	4999	0	1770	3539	1583	1770	3401	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			18				142		37	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		764			996			580			564	
Travel Time (s)		17.4			22.6			13.2			12.8	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	69	1686	54	202	2203	286	81	67	63	491	471	165
Shared Lane Traffic (%)												
Lane Group Flow (vph)	69	1740	0	202	2489	0	81	67	63	491	636	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	26.6		9.5	32.6		9.5	38.6	38.6	9.5	38.9	
Total Split (s)	10.0	51.8		21.2	63.0		17.9	41.0	41.0	36.0	59.1	
Total Split (%)	6.7%	34.5%		14.1%	42.0%		11.9%	27.3%	27.3%	24.0%	39.4%	
Maximum Green (s)	5.5	47.3		16.7	58.5		13.4	36.5	36.5	31.5	54.6	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0			7.0	7.0		7.0	
Flash Dont Walk (s)		15.1			21.1			27.1	27.1		27.4	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effct Green (s)	5.5	47.3		16.7	58.5		11.3	36.5	36.5	31.5	56.7	
Actuated g/C Ratio	0.04	0.32		0.11	0.39		0.08	0.24	0.24	0.21	0.38	
v/c Ratio	1.08	1.09		1.03	1.27		0.61	0.08	0.13	1.32	0.49	
Control Delay	199.6	98.6		134.4	163.8		85.8	44.2	0.5	208.1	35.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	199.6	98.6		134.4	163.8		85.8	44.2	0.5	208.1	35.2	
LOS	F	F		F	F		F	D	A	F	D	
Approach Delay		102.5			161.6			47.1			110.5	
Approach LOS		F			F			D			F	

Intersection Summary	
Area Type:	Other
Cycle Length: 150	
Actuated Cycle Length: 150	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.32	
Intersection Signal Delay: 129.3	Intersection LOS: F
Intersection Capacity Utilization 94.9%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 12: Whitewood Rd & Murrieta Hot Springs Rd



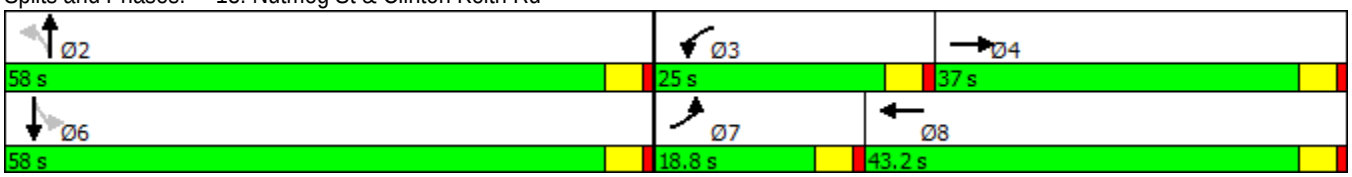
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	666	104	376	749	107	115	44	926	219	89	158
Future Volume (vph)	51	666	104	376	749	107	115	44	926	219	89	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	225		0	180		0	50		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.980			0.981			0.857			0.904	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	4984	0	1770	4989	0	1770	3033	0	1770	3199	0
Flt Permitted	0.950			0.950			0.583			0.166		
Satd. Flow (perm)	1770	4984	0	1770	4989	0	1086	3033	0	309	3199	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24			23			381			168	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		471			2233			1168			1110	
Travel Time (s)		10.7			50.8			26.5			25.2	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	54	709	111	400	797	114	122	47	985	233	95	168
Shared Lane Traffic (%)												
Lane Group Flow (vph)	54	820	0	400	911	0	122	1032	0	233	263	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	32.1		9.5	9.5		38.6	38.6		9.5	9.5	
Total Split (s)	18.8	37.0		25.0	43.2		58.0	58.0		58.0	58.0	
Total Split (%)	15.7%	30.8%		20.8%	36.0%		48.3%	48.3%		48.3%	48.3%	
Maximum Green (s)	14.3	32.5		20.5	38.7		53.5	53.5		53.5	53.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)		7.0					7.0	7.0				
Flash Dont Walk (s)		20.6					27.1	27.1				
Pedestrian Calls (#/hr)		0					0	0				
Act Effct Green (s)	8.8	25.5		20.5	39.4		53.6	53.6		53.6	53.6	
Actuated g/C Ratio	0.08	0.23		0.18	0.35		0.47	0.47		0.47	0.47	
v/c Ratio	0.39	0.72		1.25	0.52		0.24	1.04dr		1.60	0.16	
Control Delay	58.6	43.0		174.4	30.6		20.4	15.8		323.8	7.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	58.6	43.0		174.4	30.6		20.4	15.8		323.8	7.0	
LOS	E	D		F	C		C	B		F	A	
Approach Delay		43.9			74.5			16.3			155.8	
Approach LOS		D			E			B			F	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 113.2	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.60	
Intersection Signal Delay: 60.5	Intersection LOS: E
Intersection Capacity Utilization 94.4%	ICU Level of Service F
Analysis Period (min) 15	

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 13: Nutmeg St & Clinton Keith Rd

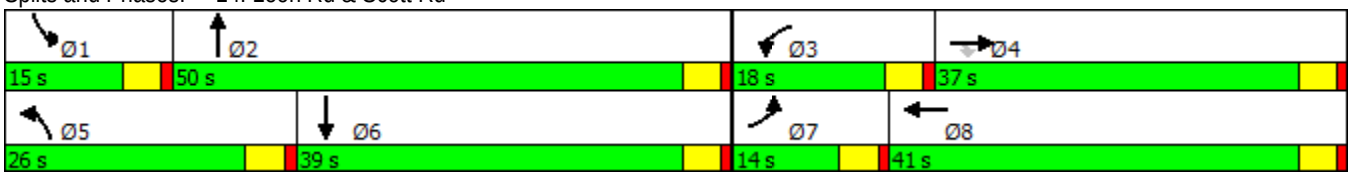


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	286	203	43	313	14	220	60	23	27	99	10
Future Volume (vph)	17	286	203	43	313	14	220	60	23	27	99	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.97	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.994			0.959			0.986	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	5085	1583	1770	5055	0	3433	3394	0	1770	3490	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	5085	1583	1770	5055	0	3433	3394	0	1770	3490	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			216		6			24			9	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		966			752			675			676	
Travel Time (s)		22.0			17.1			15.3			15.4	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	18	304	216	46	333	15	234	64	24	29	105	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	18	304	216	46	348	0	234	88	0	29	116	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									
Detector Phase	7	4	4	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	9.5	28.5	28.5	9.5	28.5		9.5	33.5		9.5	33.5	
Total Split (s)	14.0	37.0	37.0	18.0	41.0		26.0	50.0		15.0	39.0	
Total Split (%)	11.7%	30.8%	30.8%	15.0%	34.2%		21.7%	41.7%		12.5%	32.5%	
Maximum Green (s)	9.5	32.5	32.5	13.5	36.5		21.5	45.5		10.5	34.5	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Walk Time (s)		7.0	7.0		7.0			7.0			7.0	
Flash Dont Walk (s)		17.0	17.0		17.0			22.0			22.0	
Pedestrian Calls (#/hr)		0	0		0			0			0	
Act Effct Green (s)	6.4	9.6	9.6	7.2	11.9		9.3	17.8		6.7	7.4	
Actuated g/C Ratio	0.14	0.22	0.22	0.16	0.27		0.21	0.40		0.15	0.17	
v/c Ratio	0.07	0.28	0.42	0.16	0.26		0.33	0.06		0.11	0.20	
Control Delay	22.3	17.1	6.6	21.5	13.9		18.6	12.2		22.0	19.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.3	17.1	6.6	21.5	13.9		18.6	12.2		22.0	19.0	
LOS	C	B	A	C	B		B	B		C	B	
Approach Delay		13.1			14.8			16.9			19.6	
Approach LOS		B			B			B			B	

Intersection Summary	
Area Type: Other	
Cycle Length: 120	
Actuated Cycle Length: 44.6	
Natural Cycle: 85	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.42	
Intersection Signal Delay: 15.1	Intersection LOS: B
Intersection Capacity Utilization 34.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 14: Leon Rd & Scott Rd

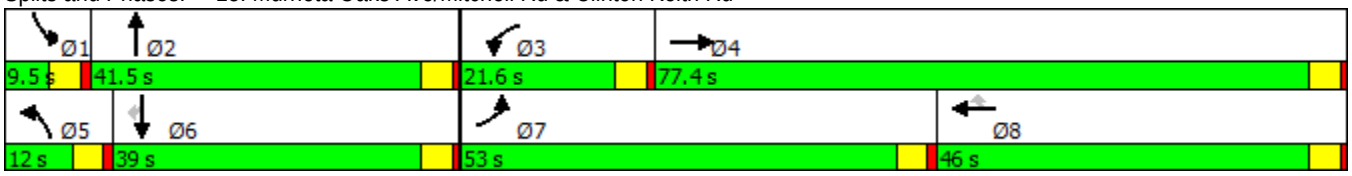


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	566	1896	209	176	1388	15	55	10	192	10	38	27
Future Volume (vph)	566	1896	209	176	1388	15	55	10	192	10	38	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		210	0		0	200		200
Storage Lanes	1		0	1		1	1		0	1		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Frt		0.985				0.850		0.857				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	5009	0	1770	5085	1583	1770	1596	0	1770	1863	2787
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	5009	0	1770	5085	1583	1770	1596	0	1770	1863	2787
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17				109		200				109
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1884			2845			958			1018	
Travel Time (s)		42.8			64.7			21.8			23.1	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	590	1975	218	183	1446	16	57	10	200	10	40	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	590	2193	0	183	1446	16	57	210	0	10	40	28
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	26.1		9.5	35.5	35.5	9.5	41.5		9.5	38.4	38.4
Total Split (s)	53.0	77.4		21.6	46.0	46.0	12.0	41.5		9.5	39.0	39.0
Total Split (%)	35.3%	51.6%		14.4%	30.7%	30.7%	8.0%	27.7%		6.3%	26.0%	26.0%
Maximum Green (s)	48.5	72.9		17.1	41.5	41.5	7.5	37.0		5.0	34.5	34.5
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	Max		None	Max	Max
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		14.6			24.0	24.0		30.0			26.9	26.9
Pedestrian Calls (#/hr)		0			0	0		0			0	0
Act Effct Green (s)	48.5	73.2		16.8	41.5	41.5	7.3	40.8		5.0	35.1	35.1
Actuated g/C Ratio	0.33	0.49		0.11	0.28	0.28	0.05	0.28		0.03	0.24	0.24
v/c Ratio	1.02	0.88		0.91	1.01	0.03	0.66	0.36		0.17	0.09	0.04
Control Delay	90.7	39.0		108.6	79.8	0.1	102.2	8.5		77.0	46.3	0.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	90.7	39.0		108.6	79.8	0.1	102.2	8.5		77.0	46.3	0.1
LOS	F	D		F	E	A	F	A		E	D	A
Approach Delay		50.0			82.2			28.5			33.6	
Approach LOS		D			F			C			C	

Intersection Summary	
Area Type: Other	
Cycle Length: 150	
Actuated Cycle Length: 148.1	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.02	
Intersection Signal Delay: 59.6	Intersection LOS: E
Intersection Capacity Utilization 81.8%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 15: Murrieta Oaks Ave/Mitchell Rd & Clinton Keith Rd

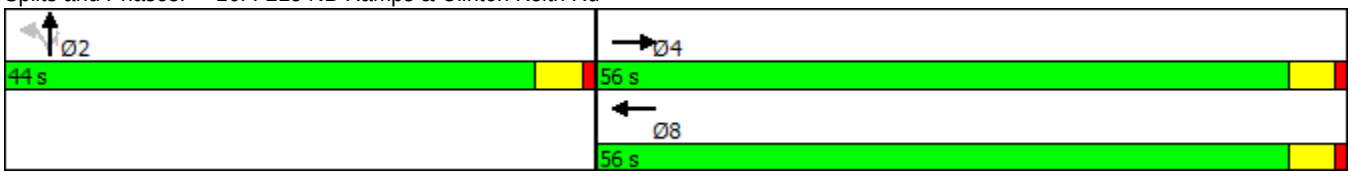


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	2426	759	0	1739	291	489	0	674	0	0	0
Future Volume (vph)	0	2426	759	0	1739	291	489	0	674	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		160	0		0	0		0	0		0
Storage Lanes	0		1	0		1	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Frt			0.850			0.850		0.970	0.850			
Flt Protected								0.961				
Satd. Flow (prot)	0	5085	1583	0	5085	1583	0	1650	1504	0	0	0
Flt Permitted								0.961				
Satd. Flow (perm)	0	5085	1583	0	5085	1583	0	1650	1504	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			227			181		16	16			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2845			3447			1631			722	
Travel Time (s)		64.7			78.3			37.1			16.4	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	0	2923	914	0	2095	351	589	0	812	0	0	0
Shared Lane Traffic (%)									18%			
Lane Group Flow (vph)	0	2923	914	0	2095	351	0	735	666	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2	1		2	1	1	2	1			
Detector Template		Thru	Right		Thru	Right	Left	Thru	Right			
Leading Detector (ft)		100	20		100	20	20	100	20			
Trailing Detector (ft)		0	0		0	0	0	0	0			
Detector 1 Position(ft)		0	0		0	0	0	0	0			
Detector 1 Size(ft)		6	20		6	20	20	6	20			
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0			
Detector 1 Queue (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0			
Detector 1 Delay (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0			
Detector 2 Position(ft)		94			94			94				
Detector 2 Size(ft)		6			6			6				
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				
Turn Type		NA	Free		NA	Free	Perm	NA	Perm			
Protected Phases		4			8			2				
Permitted Phases			Free			Free	2		2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		4			8		2	2	2			
Switch Phase												
Minimum Initial (s)		5.0			5.0		5.0	5.0	5.0			
Minimum Split (s)		43.5			9.5		9.5	9.5	9.5			
Total Split (s)		56.0			56.0		44.0	44.0	44.0			
Total Split (%)		56.0%			56.0%		44.0%	44.0%	44.0%			
Maximum Green (s)		51.5			51.5		39.5	39.5	39.5			
Yellow Time (s)		3.5			3.5		3.5	3.5	3.5			
All-Red Time (s)		1.0			1.0		1.0	1.0	1.0			
Lost Time Adjust (s)		0.0			0.0			0.0	0.0			
Total Lost Time (s)		4.5			4.5			4.5	4.5			
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0			
Recall Mode		None			None		Max	Max	Max			
Walk Time (s)		7.0										
Flash Dont Walk (s)		32.0										
Pedestrian Calls (#/hr)		0										
Act Effct Green (s)		51.5	100.0		51.5	100.0		39.5	39.5			
Actuated g/C Ratio		0.52	1.00		0.52	1.00		0.40	0.40			
v/c Ratio		1.12	0.58		0.80	0.22		1.11	1.10			
Control Delay		83.5	1.5		23.0	0.3		99.7	98.6			
Queue Delay		0.0	0.0		0.0	0.0		0.0	0.0			
Total Delay		83.5	1.5		23.0	0.3		99.7	98.6			
LOS		F	A		C	A		F	F			
Approach Delay		64.0			19.7			99.2				
Approach LOS		E			B			F				

Intersection Summary	
Area Type: Other	
Cycle Length: 100	
Actuated Cycle Length: 100	
Natural Cycle: 130	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.12	
Intersection Signal Delay: 56.3	Intersection LOS: E
Intersection Capacity Utilization 95.2%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 16: I-215 NB Ramps & Clinton Keith Rd

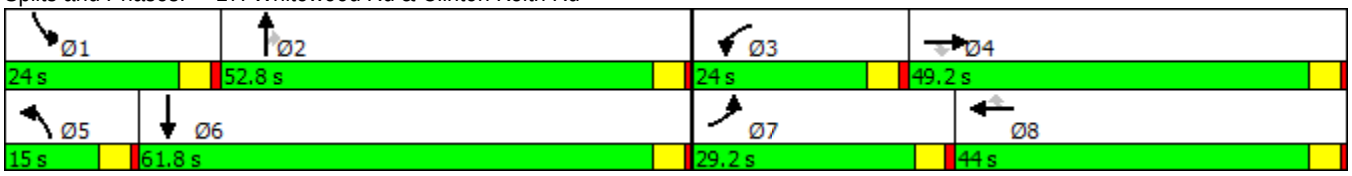


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	287	1095	187	286	968	357	132	311	277	248	550	374
Future Volume (vph)	287	1095	187	286	968	357	132	311	277	248	550	374
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	260		0	200		150	310		0	100		0
Storage Lanes	2		1	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	0.95
Frt			0.850			0.850			0.850		0.939	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3323	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3323	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			175			230			298		129	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3447			4370			3330			2871	
Travel Time (s)		78.3			99.3			75.7			65.3	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	334	1273	217	333	1126	415	153	362	322	288	640	435
Shared Lane Traffic (%)												
Lane Group Flow (vph)	334	1273	217	333	1126	415	153	362	322	288	1075	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	29.2	29.2	29.2	9.5	9.5	9.5	9.5	46.4	46.4	9.5	43.5	
Total Split (s)	29.2	49.2	49.2	24.0	44.0	44.0	15.0	52.8	52.8	24.0	61.8	
Total Split (%)	19.5%	32.8%	32.8%	16.0%	29.3%	29.3%	10.0%	35.2%	35.2%	16.0%	41.2%	
Maximum Green (s)	24.7	44.7	44.7	19.5	39.5	39.5	10.5	48.3	48.3	19.5	57.3	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	
Walk Time (s)	7.0	7.0	7.0					7.0	7.0		7.0	
Flash Dont Walk (s)	17.7	17.7	17.7					34.9	34.9		32.0	
Pedestrian Calls (#/hr)	0	0	0					0	0		0	
Act Effct Green (s)	19.5	43.5	43.5	18.0	41.9	41.9	10.1	50.5	50.5	17.0	57.4	
Actuated g/C Ratio	0.13	0.30	0.30	0.12	0.29	0.29	0.07	0.34	0.34	0.12	0.39	
v/c Ratio	0.73	0.85	0.37	0.79	0.78	0.67	0.65	0.30	0.44	0.73	0.78	
Control Delay	71.3	55.0	11.4	77.4	53.0	26.5	80.9	37.1	7.3	74.1	39.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	71.3	55.0	11.4	77.4	53.0	26.5	80.9	37.1	7.3	74.1	39.5	
LOS	E	E	B	E	D	C	F	D	A	E	D	
Approach Delay		52.8			51.5			33.6			46.9	
Approach LOS		D			D			C			D	

Intersection Summary	
Area Type: Other	
Cycle Length: 150	
Actuated Cycle Length: 146.9	
Natural Cycle: 115	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 48.3	Intersection LOS: D
Intersection Capacity Utilization 75.7%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 17: Whitewood Rd & Clinton Keith Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	159	131	258	209	225	126	578	72	269	1326	49
Future Volume (vph)	39	159	131	258	209	225	126	578	72	269	1326	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		0	205		0	230		215	250		220
Storage Lanes	1		0	1		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt		0.932				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3299	0	1770	3539	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3299	0	1770	3539	1583	3433	5085	1583	3433	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		135				232			136			136
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1401			1395			2768			2782	
Travel Time (s)		31.8			31.7			62.9			63.2	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	40	164	135	266	215	232	130	596	74	277	1367	51
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	299	0	266	215	232	130	596	74	277	1367	51
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			6

18: Jefferson Ave & Ivy St/Los Alamos Rd

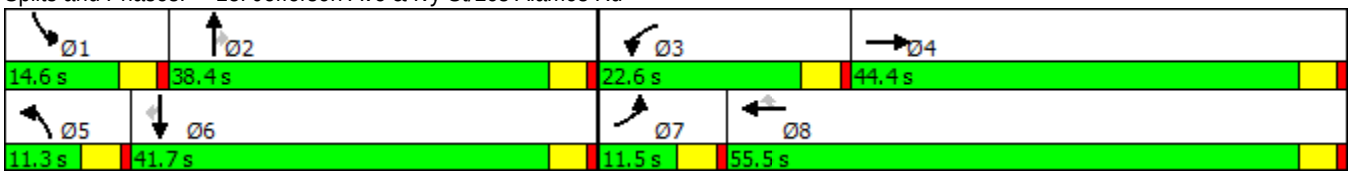
Timing Plan: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	44.4		9.5	44.4	44.4	9.5	38.4	38.4	9.5	34.4	34.4
Total Split (s)	11.5	44.4		22.6	55.5	55.5	11.3	38.4	38.4	14.6	41.7	41.7
Total Split (%)	9.6%	37.0%		18.8%	46.3%	46.3%	9.4%	32.0%	32.0%	12.2%	34.8%	34.8%
Maximum Green (s)	7.0	39.9		18.1	51.0	51.0	6.8	33.9	33.9	10.1	37.2	37.2
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		32.9			32.9	32.9		26.9	26.9		22.9	22.9
Pedestrian Calls (#/hr)		0			0	0		0	0		0	0
Act Effct Green (s)	6.6	10.0		18.1	25.8	25.8	6.8	33.9	33.9	10.1	37.2	37.2
Actuated g/C Ratio	0.07	0.11		0.20	0.29	0.29	0.08	0.38	0.38	0.11	0.41	0.41
v/c Ratio	0.31	0.62		0.75	0.21	0.37	0.50	0.31	0.11	0.72	0.65	0.07
Control Delay	46.9	26.4		49.2	26.5	5.8	47.8	20.7	0.6	50.9	23.3	0.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.9	26.4		49.2	26.5	5.8	47.8	20.7	0.6	50.9	23.3	0.2
LOS	D	C		D	C	A	D	C	A	D	C	A
Approach Delay		28.8			28.2			23.3			27.1	
Approach LOS		C			C			C			C	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 90.1
Natural Cycle: 115
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.75
Intersection Signal Delay: 26.6 — Intersection LOS: C
Intersection Capacity Utilization 67.7% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 18: Jefferson Ave & Ivy St/Los Alamos Rd

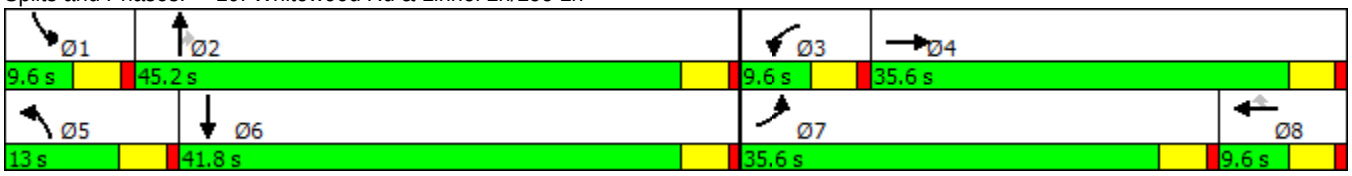


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	10	74	10	10	10	56	473	10	10	709	170
Future Volume (vph)	110	10	74	10	10	10	56	473	10	10	709	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	135		0	0		0	205		0	205		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.868				0.850			0.850		0.971	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3072	0	1770	3539	1583	1770	3539	1583	1770	3437	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3072	0	1770	3539	1583	1770	3539	1583	1770	3437	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		81				164			164		33	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1415			1455			2871			2884	
Travel Time (s)		32.2			33.1			65.3			65.5	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	121	11	81	11	11	11	62	520	11	11	779	187
Shared Lane Traffic (%)												
Lane Group Flow (vph)	121	92	0	11	11	11	62	520	11	11	966	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	35.5	35.5		9.5	9.5	9.5	9.5	27.4	27.4	9.5	32.1	
Total Split (s)	35.6	35.6		9.6	9.6	9.6	13.0	45.2	45.2	9.6	41.8	
Total Split (%)	35.6%	35.6%		9.6%	9.6%	9.6%	13.0%	45.2%	45.2%	9.6%	41.8%	
Maximum Green (s)	31.1	31.1		5.1	5.1	5.1	8.5	40.7	40.7	5.1	37.3	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)	7.0	7.0						7.0	7.0		7.0	
Flash Dont Walk (s)	24.0	24.0						15.9	15.9		20.6	
Pedestrian Calls (#/hr)	0	0						0	0		0	
Act Effct Green (s)	10.4	11.7		5.2	5.2	5.2	7.4	50.0	50.0	5.2	44.6	
Actuated g/C Ratio	0.15	0.17		0.07	0.07	0.07	0.10	0.71	0.71	0.07	0.63	
v/c Ratio	0.47	0.16		0.08	0.04	0.04	0.34	0.21	0.01	0.08	0.44	
Control Delay	35.6	9.5		37.3	36.0	0.3	37.7	6.8	0.0	37.3	11.9	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	35.6	9.5		37.3	36.0	0.3	37.7	6.8	0.0	37.3	11.9	
LOS	D	A		D	D	A	D	A	A	D	B	
Approach Delay		24.3			24.5			9.9			12.2	
Approach LOS		C			C			A			B	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 70.7	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.47	
Intersection Signal Delay: 13.1	Intersection LOS: B
Intersection Capacity Utilization 53.2%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 19: Whitewood Rd & Linnel Ln/Lee Ln

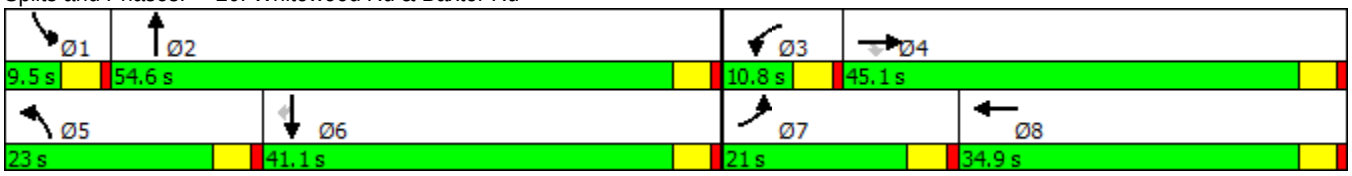


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	160	10	157	28	15	10	176	330	16	10	786	652
Future Volume (vph)	160	10	157	28	15	10	176	330	16	10	786	652
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	215		0	120		0	220		0	200		0
Storage Lanes	1		1	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850		0.939			0.993				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	3323	0	1770	3514	0	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1863	1583	1770	3323	0	1770	3514	0	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			171		11			5				709
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2823			874			2884			792	
Travel Time (s)		64.2			19.9			65.5			18.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	174	11	171	30	16	11	191	359	17	11	854	709
Shared Lane Traffic (%)												
Lane Group Flow (vph)	174	11	171	30	27	0	191	376	0	11	854	709
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	35.5	35.5	9.5	34.9		9.5	32.1		9.5	32.1	32.1
Total Split (s)	21.0	45.1	45.1	10.8	34.9		23.0	54.6		9.5	41.1	41.1
Total Split (%)	17.5%	37.6%	37.6%	9.0%	29.1%		19.2%	45.5%		7.9%	34.3%	34.3%
Maximum Green (s)	16.5	40.6	40.6	6.3	30.4		18.5	50.1		5.0	36.6	36.6
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	Max		None	Max	Max
Walk Time (s)		7.0	7.0		7.0			7.0			7.0	7.0
Flash Dont Walk (s)		24.0	24.0		23.4			20.6			20.6	20.6
Pedestrian Calls (#/hr)		0	0		0			0			0	0
Act Effct Green (s)	13.3	13.4	13.4	6.2	6.0		14.1	54.4		5.1	37.3	37.3
Actuated g/C Ratio	0.16	0.16	0.16	0.08	0.07		0.17	0.66		0.06	0.45	0.45
v/c Ratio	0.61	0.04	0.43	0.23	0.11		0.63	0.16		0.10	0.53	0.64
Control Delay	43.6	32.4	9.3	44.7	30.3		43.0	7.2		44.2	19.9	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	43.6	32.4	9.3	44.7	30.3		43.0	7.2		44.2	19.9	4.8
LOS	D	C	A	D	C		D	A		D	B	A
Approach Delay		26.8			37.9			19.3			13.3	
Approach LOS		C			D			B			B	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 82.3	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.64	
Intersection Signal Delay: 17.0	Intersection LOS: B
Intersection Capacity Utilization 65.5%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 20: Whitewood Rd & Baxter Rd



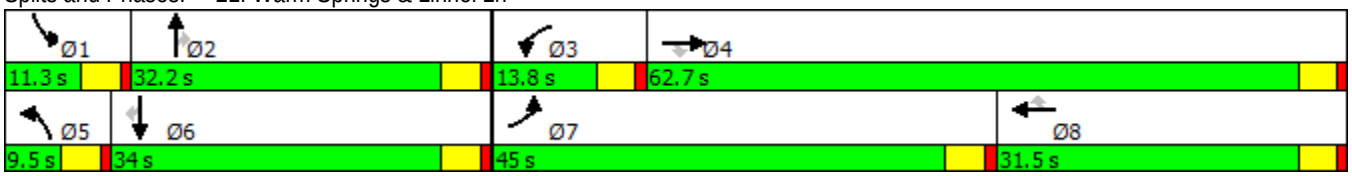
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	573	197	17	55	87	63	10	209	36	85	495	238
Future Volume (vph)	573	197	17	55	87	63	10	209	36	85	495	238
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			95			136			136			238
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		450			400			650			700	
Travel Time (s)		10.2			9.1			14.8			15.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	573	197	17	55	87	63	10	209	36	85	495	238
Shared Lane Traffic (%)												
Lane Group Flow (vph)	573	197	17	55	87	63	10	209	36	85	495	238
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	9.5	31.5	31.5	9.5	31.5	31.5	9.5	31.5	31.5	9.5	31.5	31.5
Total Split (s)	45.0	62.7	62.7	13.8	31.5	31.5	9.5	32.2	32.2	11.3	34.0	34.0
Total Split (%)	37.5%	52.3%	52.3%	11.5%	26.3%	26.3%	7.9%	26.8%	26.8%	9.4%	28.3%	28.3%
Maximum Green (s)	40.5	58.2	58.2	9.3	27.0	27.0	5.0	27.7	27.7	6.8	29.5	29.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		20.0	20.0		20.0	20.0		20.0	20.0		20.0	20.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	34.0	33.8	33.8	7.8	7.7	7.7	5.2	12.1	12.1	7.1	22.5	22.5
Actuated g/C Ratio	0.44	0.44	0.44	0.10	0.10	0.10	0.07	0.16	0.16	0.09	0.29	0.29
v/c Ratio	0.73	0.13	0.02	0.30	0.25	0.23	0.08	0.37	0.10	0.52	0.48	0.38
Control Delay	26.1	14.7	0.1	41.4	38.1	1.9	42.4	32.3	0.6	51.6	26.4	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.1	14.7	0.1	41.4	38.1	1.9	42.4	32.3	0.6	51.6	26.4	5.8
LOS	C	B	A	D	D	A	D	C	A	D	C	A
Approach Delay		22.7			27.8			28.2			23.1	
Approach LOS		C			C			C			C	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 76.7
Natural Cycle: 115
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.73
Intersection Signal Delay: 24.0 — Intersection LOS: C
Intersection Capacity Utilization 68.8% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 21: Warm Springs & Linnel Ln



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	52	134	10	118	10	382	217	10	10	840	55
Future Volume (vph)	16	52	134	10	118	10	382	217	10	10	840	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.993			0.991	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	3514	0	1770	3507	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	3514	0	1770	3507	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			136			136		6			6	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		4817			1737			695			730	
Travel Time (s)		109.5			39.5			15.8			16.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	16	52	134	10	118	10	382	217	10	10	840	55
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	52	134	10	118	10	382	227	0	10	895	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Detector Phase	7	4	4	3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	9.5	31.5	31.5	9.5	31.5	31.5	9.5	31.5		9.5	31.5	
Total Split (s)	9.6	31.6	31.6	9.5	31.5	31.5	37.0	69.4		9.5	41.9	
Total Split (%)	8.0%	26.3%	26.3%	7.9%	26.3%	26.3%	30.8%	57.8%		7.9%	34.9%	
Maximum Green (s)	5.1	27.1	27.1	5.0	27.0	27.0	32.5	64.9		5.0	37.4	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)		7.0	7.0		7.0	7.0		7.0			7.0	
Flash Dont Walk (s)		20.0	20.0		20.0	20.0		20.0			20.0	
Pedestrian Calls (#/hr)		0	0		0	0		0			0	
Act Effct Green (s)	5.5	10.2	10.2	5.4	8.7	8.7	23.8	55.8		5.4	28.6	
Actuated g/C Ratio	0.07	0.13	0.13	0.07	0.11	0.11	0.30	0.71		0.07	0.36	
v/c Ratio	0.13	0.11	0.41	0.08	0.30	0.03	0.71	0.09		0.08	0.70	
Control Delay	46.6	35.9	11.7	45.9	39.8	0.2	34.7	4.6		45.9	25.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	46.6	35.9	11.7	45.9	39.8	0.2	34.7	4.6		45.9	25.9	
LOS	D	D	B	D	D	A	C	A		D	C	
Approach Delay		20.7			37.3			23.5			26.1	
Approach LOS		C			D			C			C	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 78.5
Natural Cycle: 95
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 25.5 — Intersection LOS: C
Intersection Capacity Utilization 64.9% — ICU Level of Service C
Analysis Period (min) 15

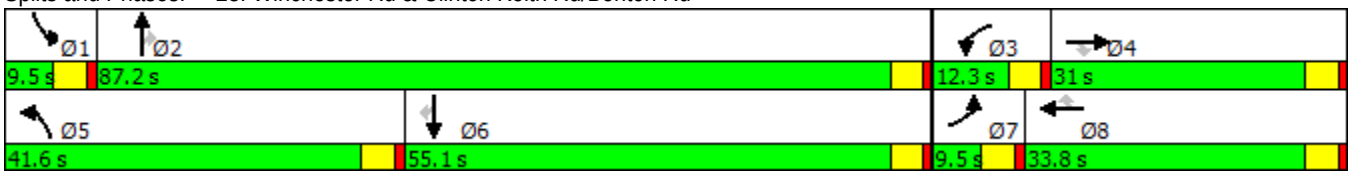
Splits and Phases: 22: Briggs Rd & Keller Rd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	265	924	132	231	10	800	877	124	10	1635	10
Future Volume (vph)	10	265	924	132	231	10	800	877	124	10	1635	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		150	0		0	0		0	0		0
Storage Lanes	2		2	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.88	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	2787	3433	3539	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3539	2787	3433	3539	1583	3433	5085	1583	3433	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			716			117			124			117
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		4370			1699			998			766	
Travel Time (s)		99.3			38.6			22.7			17.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	10	265	924	132	231	10	800	877	124	10	1635	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	10	265	924	132	231	10	800	877	124	10	1635	10
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	9.5	31.0	31.0	12.3	33.8	33.8	41.6	87.2	87.2	9.5	55.1	55.1
Total Split (%)	6.8%	22.1%	22.1%	8.8%	24.1%	24.1%	29.7%	62.3%	62.3%	6.8%	39.4%	39.4%
Maximum Green (s)	5.0	26.5	26.5	7.8	29.3	29.3	37.1	82.7	82.7	5.0	50.6	50.6
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	5.0	21.8	21.8	7.8	32.3	32.3	34.2	87.9	87.9	5.0	51.1	51.1
Actuated g/C Ratio	0.04	0.16	0.16	0.06	0.24	0.24	0.26	0.66	0.66	0.04	0.38	0.38
v/c Ratio	0.08	0.46	0.88	0.66	0.27	0.02	0.91	0.26	0.11	0.08	0.84	0.01
Control Delay	66.5	52.8	22.2	78.9	42.5	0.1	63.0	10.2	2.1	66.5	43.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.5	52.8	22.2	78.9	42.5	0.1	63.0	10.2	2.1	66.5	43.0	0.0
LOS	E	D	C	E	D	A	E	B	A	E	D	A
Approach Delay		29.3			54.2			33.1			42.9	
Approach LOS		C			D			C			D	

Intersection Summary	
Area Type: Other	
Cycle Length: 140	
Actuated Cycle Length: 132.9	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 37.0	Intersection LOS: D
Intersection Capacity Utilization 80.9%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 23: Winchester Rd & Clinton Keith Rd/Benton Rd



1: Jefferson Ave & Murrieta Hot Springs Rd

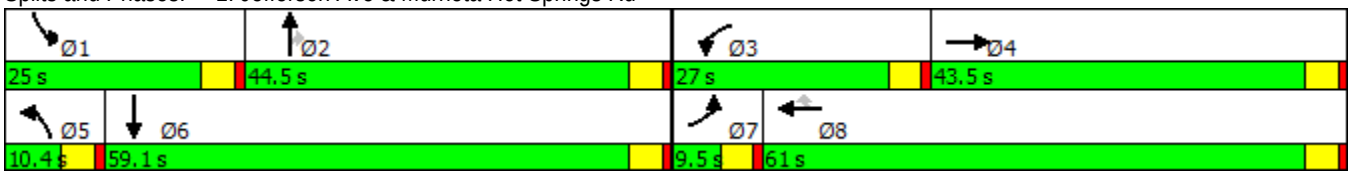
Timing Plan: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	131	23	376	98	835	19	1546	1067	672	940	14
Future Volume (vph)	10	131	23	376	98	835	19	1546	1067	672	940	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		265	0		280	185		0
Storage Lanes	1		0	1		1	1		2	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	0.91	0.88	0.97	0.91	0.91
Frt		0.978				0.850			0.850		0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	4973	0	1770	5085	1583	1770	5085	2787	3433	5075	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	4973	0	1770	5085	1583	1770	5085	2787	3433	5075	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25				347			828		2	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		687			1412			1630			2768	
Travel Time (s)		15.6			32.1			37.0			62.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	142	25	409	107	908	21	1680	1160	730	1022	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	167	0	409	107	908	21	1680	1160	730	1037	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		36			36			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	43.5		9.5	44.4	44.4	9.5	33.8	33.8	9.5	22.5	
Total Split (s)	9.5	43.5		27.0	61.0	61.0	10.4	44.5	44.5	25.0	59.1	
Total Split (%)	6.8%	31.1%		19.3%	43.6%	43.6%	7.4%	31.8%	31.8%	17.9%	42.2%	
Maximum Green (s)	5.0	39.0		22.5	56.5	56.5	5.9	40.0	40.0	20.5	54.6	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0		7.0	7.0			
Flash Dont Walk (s)		32.0			32.9	32.9		22.3	22.3			
Pedestrian Calls (#/hr)		0			0	0		0	0			
Act Effct Green (s)	5.0	33.2		22.5	56.6	56.6	5.8	40.0	40.0	20.5	58.9	
Actuated g/C Ratio	0.04	0.25		0.17	0.42	0.42	0.04	0.30	0.30	0.15	0.44	
v/c Ratio	0.17	0.13		1.38	0.05	1.05	0.28	1.11	0.82	1.39	0.47	
Control Delay	70.5	33.2		231.6	23.9	67.6	73.1	102.4	17.8	229.5	28.6	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	70.5	33.2		231.6	23.9	67.6	73.1	102.4	17.8	229.5	28.6	
LOS	E	C		F	C	E	E	F	B	F	C	
Approach Delay		35.5			111.4			67.9			111.6	
Approach LOS		D			F			E			F	

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 134.3	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.39	
Intersection Signal Delay: 89.3	Intersection LOS: F
Intersection Capacity Utilization 97.0%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 1: Jefferson Ave & Murrieta Hot Springs Rd

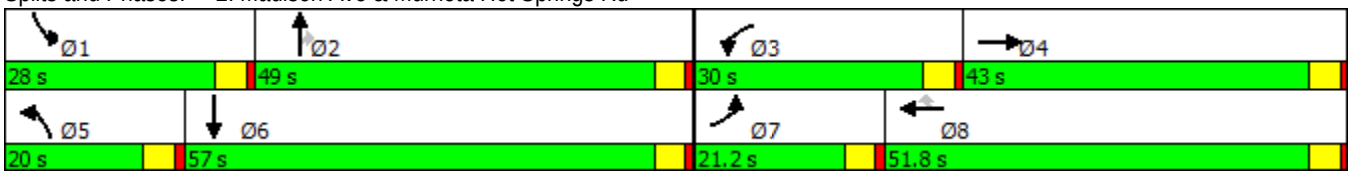


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	320	1637	83	657	1237	549	194	787	660	614	460	124
Future Volume (vph)	320	1637	83	657	1237	549	194	787	660	614	460	124
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	250		0	100		100	165		0
Storage Lanes	2		0	2		1	2		2	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.86	0.86	0.97	0.91	1.00	0.97	0.95	0.88	0.97	0.95	0.95
Frt		0.993				0.850			0.850		0.968	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	6363	0	3433	5085	1583	3433	3539	2787	3433	3426	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	6363	0	3433	5085	1583	3433	3539	2787	3433	3426	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				272			272		25	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1412			2198			1707			1381	
Travel Time (s)		32.1			50.0			38.8			31.4	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	360	1839	93	738	1390	617	218	884	742	690	517	139
Shared Lane Traffic (%)												
Lane Group Flow (vph)	360	1932	0	738	1390	617	218	884	742	690	656	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	35.5		9.5	38.4	38.4	9.5	45.2	45.2	9.5	45.2	
Total Split (s)	21.2	43.0		30.0	51.8	51.8	20.0	49.0	49.0	28.0	57.0	
Total Split (%)	14.1%	28.7%		20.0%	34.5%	34.5%	13.3%	32.7%	32.7%	18.7%	38.0%	
Maximum Green (s)	16.7	38.5		25.5	47.3	47.3	15.5	44.5	44.5	23.5	52.5	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		24.0			26.9	26.9		33.7	33.7		33.7	
Pedestrian Calls (#/hr)		0			0	0		0	0		0	
Act Effct Green (s)	16.7	38.5		25.5	47.3	47.3	14.0	44.5	44.5	23.5	54.0	
Actuated g/C Ratio	0.11	0.26		0.17	0.32	0.32	0.09	0.30	0.30	0.16	0.36	
v/c Ratio	0.94	1.18		1.27	0.87	0.90	0.68	0.84	0.73	1.28	0.52	
Control Delay	99.0	135.4		181.6	55.3	44.5	77.0	58.1	34.0	190.5	38.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	99.0	135.4		181.6	55.3	44.5	77.0	58.1	34.0	190.5	38.4	
LOS	F	F		F	E	D	E	E	C	F	D	
Approach Delay		129.7			86.8			50.6			116.4	
Approach LOS		F			F			D			F	

Intersection Summary	
Area Type:	Other
Cycle Length: 150	
Actuated Cycle Length: 150	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.28	
Intersection Signal Delay: 95.5	Intersection LOS: F
Intersection Capacity Utilization 98.1%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 2: Madison Ave & Murrieta Hot Springs Rd

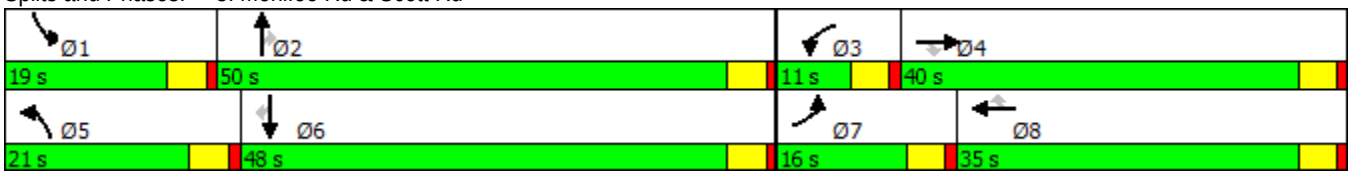


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	176	806	169	71	704	105	121	891	154	99	671	71
Future Volume (vph)	176	806	169	71	704	105	121	891	154	99	671	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	195		0	155		0	150		0
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	1770	3539	1583	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			171			136			156			136
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		804			428			403			545	
Travel Time (s)		18.3			9.7			9.2			12.4	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	178	814	171	72	711	106	122	900	156	100	678	72
Shared Lane Traffic (%)												
Lane Group Flow (vph)	178	814	171	72	711	106	122	900	156	100	678	72
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	38.6	38.6	9.5	9.5	9.5	9.5	9.5	9.5	9.5	36.6	36.6
Total Split (s)	16.0	40.0	40.0	11.0	35.0	35.0	21.0	50.0	50.0	19.0	48.0	48.0
Total Split (%)	13.3%	33.3%	33.3%	9.2%	29.2%	29.2%	17.5%	41.7%	41.7%	15.8%	40.0%	40.0%
Maximum Green (s)	11.5	35.5	35.5	6.5	30.5	30.5	16.5	45.5	45.5	14.5	43.5	43.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)		7.0	7.0								7.0	7.0
Flash Dont Walk (s)		27.1	27.1								25.1	25.1
Pedestrian Calls (#/hr)		0	0								0	0
Act Effct Green (s)	10.2	28.9	28.9	6.4	22.7	22.7	12.4	45.9	45.9	11.1	44.5	44.5
Actuated g/C Ratio	0.09	0.27	0.27	0.06	0.21	0.21	0.11	0.42	0.42	0.10	0.41	0.41
v/c Ratio	0.55	0.60	0.31	0.35	0.67	0.24	0.60	0.60	0.20	0.55	0.47	0.10
Control Delay	54.9	37.1	6.4	56.8	42.5	4.1	59.5	27.5	4.5	59.5	25.9	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.9	37.1	6.4	56.8	42.5	4.1	59.5	27.5	4.5	59.5	25.9	0.3
LOS	D	D	A	E	D	A	E	C	A	E	C	A
Approach Delay		35.3			39.1			27.7			27.7	
Approach LOS		D			D			C			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 108	
Natural Cycle: 95	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.67	
Intersection Signal Delay: 32.4	Intersection LOS: C
Intersection Capacity Utilization 64.9%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 3: Menifee Rd & Scott Rd

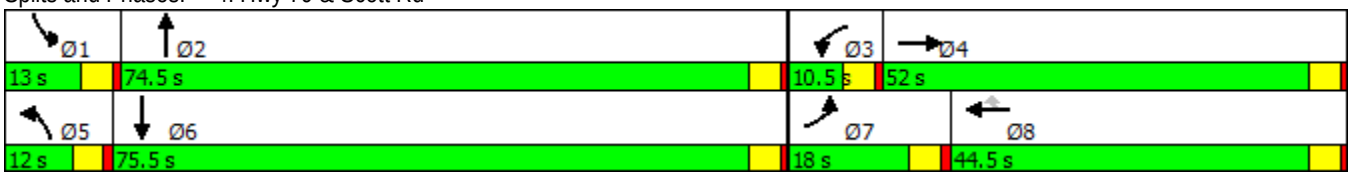


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	203	67	49	10	143	484	77	2901	10	225	2121	115
Future Volume (vph)	203	67	49	10	143	484	77	2901	10	225	2121	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	0.91	0.91	0.97	0.91	0.91
Frt		0.937				0.850		0.999			0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	4765	0	1770	5085	1583	1770	5080	0	3433	5045	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	4765	0	1770	5085	1583	1770	5080	0	3433	5045	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		53				109					7	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1266			804			669			738	
Travel Time (s)		28.8			18.3			15.2			16.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	221	73	53	11	155	526	84	3153	11	245	2305	125
Shared Lane Traffic (%)												
Lane Group Flow (vph)	221	126	0	11	155	526	84	3164	0	245	2430	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Detector Phase	7	4		3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	9.5	50.9		9.5	9.5	9.5	9.5	41.9		9.5	49.8	
Total Split (s)	18.0	52.0		10.5	44.5	44.5	12.0	74.5		13.0	75.5	
Total Split (%)	12.0%	34.7%		7.0%	29.7%	29.7%	8.0%	49.7%		8.7%	50.3%	
Maximum Green (s)	13.5	47.5		6.0	40.0	40.0	7.5	70.0		8.5	71.0	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max		None	Max	
Walk Time (s)		7.0						7.0			7.0	
Flash Dont Walk (s)		39.4						30.4			38.3	
Pedestrian Calls (#/hr)		0						0			0	
Act Effct Green (s)	13.5	53.8		5.8	40.0	40.0	7.5	70.0		8.5	71.0	
Actuated g/C Ratio	0.09	0.36		0.04	0.27	0.27	0.05	0.47		0.06	0.47	
v/c Ratio	1.39	0.07		0.16	0.11	1.05	0.95	1.34		1.26	1.02	
Control Delay	256.4	19.5		75.1	41.9	94.6	152.9	187.4		206.6	61.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	256.4	19.5		75.1	41.9	94.6	152.9	187.4		206.6	61.4	
LOS	F	B		E	D	F	F	F		F	E	
Approach Delay		170.4			82.5			186.5			74.7	
Approach LOS		F			F			F			E	

Intersection Summary	
Area Type:	Other
Cycle Length: 150	
Actuated Cycle Length: 150	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.39	
Intersection Signal Delay: 132.4	Intersection LOS: F
Intersection Capacity Utilization 108.7%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 4: Hwy 79 & Scott Rd

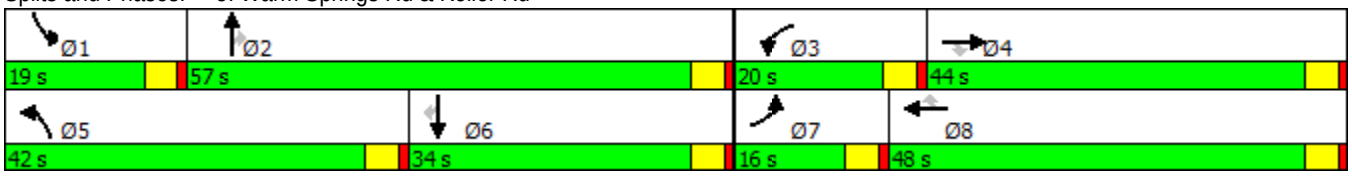


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	111	453	404	79	580	110	543	401	60	71	266	112
Future Volume (vph)	111	453	404	79	580	110	543	401	60	71	266	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	120		0	195		0	110		110	120		0
Storage Lanes	2		1	1		1	2		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	3433	3539	1583	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	1770	5085	1583	3433	3539	1583	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			430			117			82			119
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1361			4817			5440			744	
Travel Time (s)		30.9			109.5			123.6			16.9	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	118	482	430	84	617	117	578	427	64	76	283	119
Shared Lane Traffic (%)												
Lane Group Flow (vph)	118	482	430	84	617	117	578	427	64	76	283	119
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	29.2	29.2	9.5	26.9	26.9	9.5	30.9	30.9	9.5	29.2	29.2
Total Split (s)	16.0	44.0	44.0	20.0	48.0	48.0	42.0	57.0	57.0	19.0	34.0	34.0
Total Split (%)	11.4%	31.4%	31.4%	14.3%	34.3%	34.3%	30.0%	40.7%	40.7%	13.6%	24.3%	24.3%
Maximum Green (s)	11.5	39.5	39.5	15.5	43.5	43.5	37.5	52.5	52.5	14.5	29.5	29.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		17.7	17.7		15.4	15.4		19.4	19.4		17.7	17.7
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	9.1	22.7	22.7	10.7	21.4	21.4	23.5	53.4	53.4	10.1	37.2	37.2
Actuated g/C Ratio	0.08	0.21	0.21	0.10	0.20	0.20	0.21	0.49	0.49	0.09	0.34	0.34
v/c Ratio	0.41	0.46	0.64	0.49	0.62	0.29	0.78	0.25	0.08	0.47	0.24	0.19
Control Delay	55.0	41.7	8.9	59.6	43.7	8.9	49.5	19.3	3.2	59.7	29.1	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.0	41.7	8.9	59.6	43.7	8.9	49.5	19.3	3.2	59.7	29.1	6.8
LOS	E	D	A	E	D	A	D	B	A	E	C	A
Approach Delay		29.5			40.4			34.7			28.4	
Approach LOS		C			D			C			C	

Intersection Summary	
Area Type: Other	
Cycle Length: 140	
Actuated Cycle Length: 109.6	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 33.6	Intersection LOS: C
Intersection Capacity Utilization 53.2%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 5: Warm Springs Rd & Keller Rd

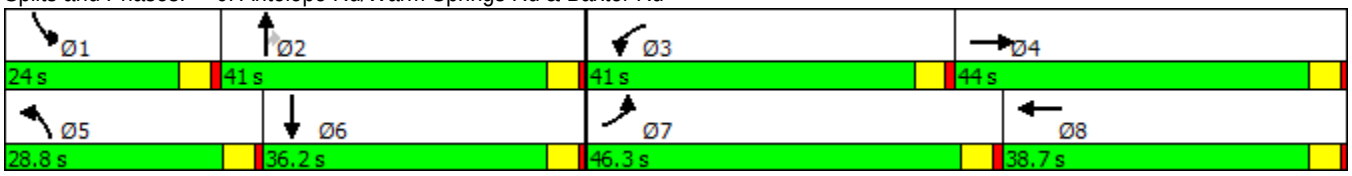


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	339	496	403	375	219	115	227	337	385	190	269	171
Future Volume (vph)	339	496	403	375	219	115	227	337	385	190	269	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		20	150		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.933			0.948				0.850		0.942	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3302	0	1770	3355	0	1770	3539	1583	1770	3334	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3302	0	1770	3355	0	1770	3539	1583	1770	3334	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		133			59				124		85	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		620			2823			806			5440	
Travel Time (s)		14.1			64.2			18.3			123.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	339	496	403	375	219	115	227	337	385	190	269	171
Shared Lane Traffic (%)												
Lane Group Flow (vph)	339	899	0	375	334	0	227	337	385	190	440	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	28.5		9.5	28.5		9.5	34.9	34.9	9.5	28.5	
Total Split (s)	46.3	44.0		41.0	38.7		28.8	41.0	41.0	24.0	36.2	
Total Split (%)	30.9%	29.3%		27.3%	25.8%		19.2%	27.3%	27.3%	16.0%	24.1%	
Maximum Green (s)	41.8	39.5		36.5	34.2		24.3	36.5	36.5	19.5	31.7	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0			7.0	7.0		7.0	
Flash Dont Walk (s)		17.0			17.0			17.0	17.0		17.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effct Green (s)	32.8	38.0		33.6	38.8		21.9	36.7	36.7	18.3	33.1	
Actuated g/C Ratio	0.23	0.26		0.23	0.27		0.15	0.25	0.25	0.13	0.23	
v/c Ratio	0.85	0.93		0.91	0.35		0.85	0.38	0.78	0.85	0.53	
Control Delay	72.8	61.1		81.8	37.4		87.4	47.2	46.6	93.6	43.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	72.8	61.1		81.8	37.4		87.4	47.2	46.6	93.6	43.1	
LOS	E	E		F	D		F	D	D	F	D	
Approach Delay		64.3			60.9			56.6			58.3	
Approach LOS		E			E			E			E	

Intersection Summary	
Area Type: Other	
Cycle Length: 150	
Actuated Cycle Length: 144.6	
Natural Cycle: 105	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 60.5	Intersection LOS: E
Intersection Capacity Utilization 87.9%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 6: Antelope Rd/Warm Springs Rd & Baxter Rd

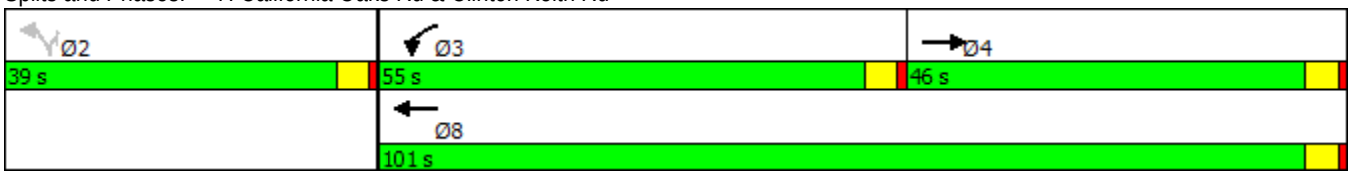


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1364	318	807	1619	217	765
Future Volume (vph)	1364	318	807	1619	217	765
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	225		100	0
Storage Lanes		0	1		1	2
Taper Length (ft)			25		25	
Lane Util. Factor	0.91	0.91	1.00	0.91	1.00	0.88
Frt	0.972					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	4943	0	1770	5085	1770	2787
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	4943	0	1770	5085	1770	2787
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	39					805
Link Speed (mph)	30			30	30	
Link Distance (ft)	2233			3569	625	
Travel Time (s)	50.8			81.1	14.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1436	335	849	1704	228	805
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1771	0	849	1704	228	805
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Number of Detectors	2		1	2	1	1
Detector Template	Thru		Left	Thru	Left	Right
Leading Detector (ft)	100		20	100	20	20
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	6		20	6	20	20
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Prot	NA	Perm	Perm
Protected Phases	4		3	8		
Permitted Phases					2	2

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	4		3	8	2	2
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0
Minimum Split (s)	36.6		9.5	9.5	37.2	37.2
Total Split (s)	46.0		55.0	101.0	39.0	39.0
Total Split (%)	32.9%		39.3%	72.1%	27.9%	27.9%
Maximum Green (s)	41.5		50.5	96.5	34.5	34.5
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5		4.5	4.5	4.5	4.5
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	None	Max	Max
Walk Time (s)	7.0				7.0	7.0
Flash Dont Walk (s)	25.1				25.7	25.7
Pedestrian Calls (#/hr)	0				0	0
Act Effct Green (s)	41.5		50.5	96.5	34.5	34.5
Actuated g/C Ratio	0.30		0.36	0.69	0.25	0.25
v/c Ratio	1.19		1.33	0.49	0.52	0.62
Control Delay	133.2		195.9	10.7	50.7	5.0
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	133.2		195.9	10.7	50.7	5.0
LOS	F		F	B	D	A
Approach Delay	133.2			72.3	15.1	
Approach LOS	F			E	B	

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 140	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.33	
Intersection Signal Delay: 81.4	Intersection LOS: F
Intersection Capacity Utilization 101.4%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 7: California Oaks Rd & Clinton Keith Rd

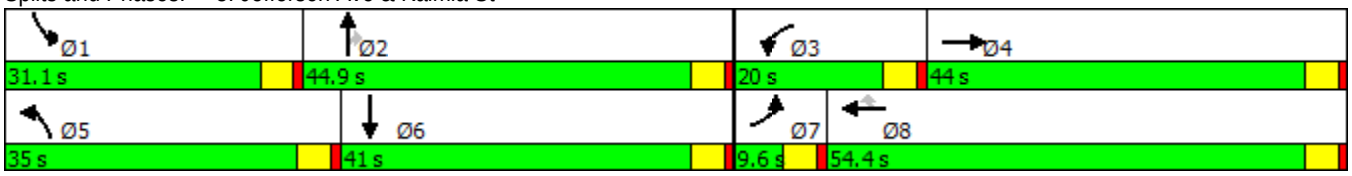


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	561	340	185	489	561	724	1194	506	295	855	22
Future Volume (vph)	14	561	340	185	489	561	724	1194	506	295	855	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		140	235		0	205		0	145		0
Storage Lanes	1		0	1		1	2		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.95	1.00	0.97	0.91	1.00	1.00	0.91	0.91
Frt		0.943				0.850			0.850		0.996	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	4795	0	1770	3539	1583	3433	5085	1583	1770	5065	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	4795	0	1770	3539	1583	3433	5085	1583	1770	5065	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		109				474			225		3	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1399			684			2782			1004	
Travel Time (s)		31.8			15.5			63.2			22.8	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	15	616	374	203	537	616	796	1312	556	324	940	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	15	990	0	203	537	616	796	1312	556	324	964	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	44.0		9.5	34.9	34.9	9.5	38.6	38.6	9.5	39.5	
Total Split (s)	9.6	44.0		20.0	54.4	54.4	35.0	44.9	44.9	31.1	41.0	
Total Split (%)	6.9%	31.4%		14.3%	38.9%	38.9%	25.0%	32.1%	32.1%	22.2%	29.3%	
Maximum Green (s)	5.1	39.5		15.5	49.9	49.9	30.5	40.4	40.4	26.6	36.5	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		32.5			23.4	23.4		27.1	27.1		28.0	
Pedestrian Calls (#/hr)		0			0	0		0	0		0	
Act Effct Green (s)	5.1	33.2		15.5	49.5	49.5	30.5	40.8	40.8	26.3	36.6	
Actuated g/C Ratio	0.04	0.25		0.12	0.37	0.37	0.23	0.30	0.30	0.20	0.27	
v/c Ratio	0.22	0.78		0.99	0.41	0.70	1.02	0.85	0.87	0.93	0.70	
Control Delay	72.6	46.2		119.3	33.0	12.9	87.1	50.3	41.9	86.8	47.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	72.6	46.2		119.3	33.0	12.9	87.1	50.3	41.9	86.8	47.2	
LOS	E	D		F	C	B	F	D	D	F	D	
Approach Delay		46.6			36.8			59.6			57.1	
Approach LOS		D			D			E			E	

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 133.8	
Natural Cycle: 135	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.02	
Intersection Signal Delay: 52.1	Intersection LOS: D
Intersection Capacity Utilization 83.1%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 8: Jefferson Ave & Kalmia St

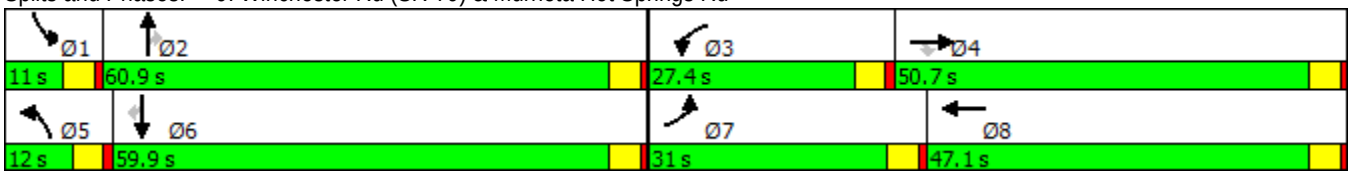


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1680	775	192	341	900	291	332	1943	179	238	1166	1254
Future Volume (vph)	1680	775	192	341	900	291	332	1943	179	238	1166	1254
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	195		200	195		200	205		0	210		0
Storage Lanes	2		1	2		0	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	0.91	0.97	0.91	1.00	0.97	0.91	1.00
Frt			0.850		0.963				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	3433	4897	0	3433	5085	1583	3433	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	4897	0	3433	5085	1583	3433	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			105		54				107			354
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1422			1339			680			585	
Travel Time (s)		32.3			30.4			15.5			13.3	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1732	799	198	352	928	300	342	2003	185	245	1202	1293
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1732	799	198	352	1228	0	342	2003	185	245	1202	1293
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4						2			6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	9.5	9.5	9.5	47.1		9.5	44.4	44.4	9.5	44.9	44.9
Total Split (s)	31.0	50.7	50.7	27.4	47.1		12.0	60.9	60.9	11.0	59.9	59.9
Total Split (%)	20.7%	33.8%	33.8%	18.3%	31.4%		8.0%	40.6%	40.6%	7.3%	39.9%	39.9%
Maximum Green (s)	26.5	46.2	46.2	22.9	42.6		7.5	56.4	56.4	6.5	55.4	55.4
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	Max	Max	None	Max	Max
Walk Time (s)					7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)					35.6			32.9	32.9		33.4	33.4
Pedestrian Calls (#/hr)					0			0	0		0	0
Act Effct Green (s)	26.5	48.2	48.2	19.9	41.6		7.5	56.4	56.4	6.5	55.4	55.4
Actuated g/C Ratio	0.18	0.32	0.32	0.13	0.28		0.05	0.38	0.38	0.04	0.37	0.37
v/c Ratio	2.84	0.49	0.34	0.77	0.87		1.99	1.04	0.28	1.64	0.64	1.60
Control Delay	853.1	42.1	19.7	73.9	56.9		496.8	76.8	14.7	358.6	40.5	298.3
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	853.1	42.1	19.7	73.9	56.9		496.8	76.8	14.7	358.6	40.5	298.3
LOS	F	D	B	E	E		F	E	B	F	D	F
Approach Delay		555.2			60.6			129.1			190.6	
Approach LOS		F			E			F			F	

Intersection Summary	
Area Type: Other	
Cycle Length: 150	
Actuated Cycle Length: 149	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 2.84	
Intersection Signal Delay: 256.8	Intersection LOS: F
Intersection Capacity Utilization 131.1%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 9: Winchester Rd (SR-79) & Murrieta Hot Springs Rd

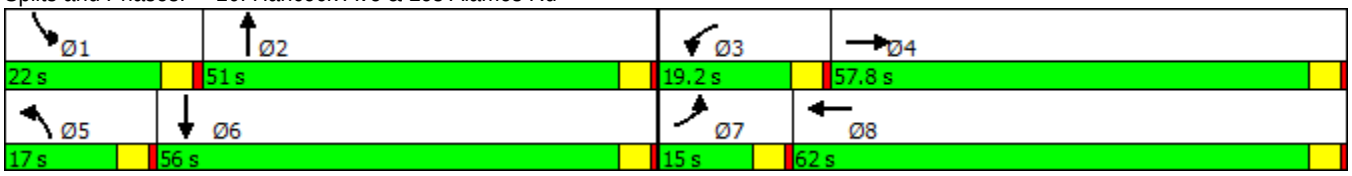


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	143	1094	79	151	796	913	187	686	505	539	446	126
Future Volume (vph)	143	1094	79	151	796	913	187	686	505	539	446	126
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	100		0	100		0	225		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	0.97	1.00	1.00
Frt		0.990			0.920			0.936			0.967	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3504	0	1770	3256	0	1770	3313	0	3433	1801	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3504	0	1770	3256	0	1770	3313	0	3433	1801	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			223			128			10	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		440			1059			599			686	
Travel Time (s)		10.0			24.1			13.6			15.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	155	1189	86	164	865	992	203	746	549	586	485	137
Shared Lane Traffic (%)												
Lane Group Flow (vph)	155	1275	0	164	1857	0	203	1295	0	586	622	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	36.4		9.5	36.4		9.5	36.9		9.5	36.4	
Total Split (s)	15.0	57.8		19.2	62.0		17.0	51.0		22.0	56.0	
Total Split (%)	10.0%	38.5%		12.8%	41.3%		11.3%	34.0%		14.7%	37.3%	
Maximum Green (s)	10.5	53.3		14.7	57.5		12.5	46.5		17.5	51.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Max		None	Max	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		24.9			24.9			25.4			24.9	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	10.5	53.3		14.7	57.5		12.5	46.5		17.5	51.5	
Actuated g/C Ratio	0.07	0.36		0.10	0.38		0.08	0.31		0.12	0.34	
v/c Ratio	1.26	1.02		0.95	1.34		1.38	1.16		1.47	1.00	
Control Delay	219.9	78.0		122.0	191.3		255.7	123.9		266.4	83.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	219.9	78.0		122.0	191.3		255.7	123.9		266.4	83.1	
LOS	F	E		F	F		F	F		F	F	
Approach Delay		93.4			185.6			141.7			172.0	
Approach LOS		F			F			F			F	

Intersection Summary	
Area Type:	Other
Cycle Length: 150	
Actuated Cycle Length: 150	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.47	
Intersection Signal Delay: 150.9	Intersection LOS: F
Intersection Capacity Utilization 124.8%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 10: Hancock Ave & Los Alamos Rd

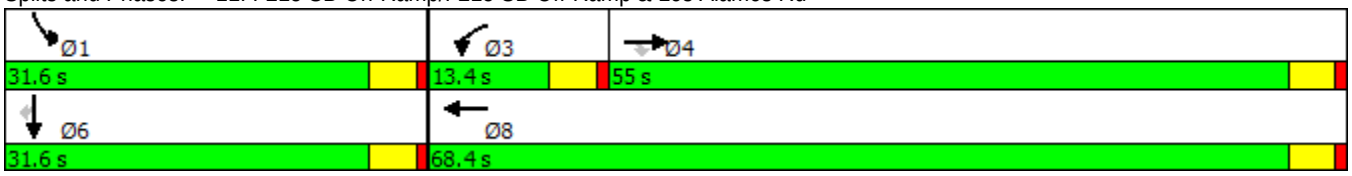


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1810	308	284	1194	0	0	0	0	220	5	920
Future Volume (vph)	0	1810	308	284	1194	0	0	0	0	220	5	920
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		95	100		0	0		0	305		305
Storage Lanes	0		1	2		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	0.95	0.91	0.95
Frt			0.850								0.859	0.850
Flt Protected				0.950						0.950	0.998	
Satd. Flow (prot)	0	3539	1583	3433	3539	0	0	0	0	1681	1453	1504
Flt Permitted				0.950						0.950	0.998	
Satd. Flow (perm)	0	3539	1583	3433	3539	0	0	0	0	1681	1453	1504
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			113								84	84
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1059			394			642			451	
Travel Time (s)		24.1			9.0			14.6			10.3	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	1866	318	293	1231	0	0	0	0	227	5	948
Shared Lane Traffic (%)										10%		49%
Lane Group Flow (vph)	0	1866	318	293	1231	0	0	0	0	204	493	483
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2	1	1	2					1	2	1
Detector Template		Thru	Right	Left	Thru					Left	Thru	Right
Leading Detector (ft)		100	20	20	100					20	100	20
Trailing Detector (ft)		0	0	0	0					0	0	0
Detector 1 Position(ft)		0	0	0	0					0	0	0
Detector 1 Size(ft)		6	20	20	6					20	6	20
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Detector 2 Position(ft)		94			94						94	
Detector 2 Size(ft)		6			6						6	
Detector 2 Type		Cl+Ex			Cl+Ex						Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0						0.0	
Turn Type		NA	Perm	Prot	NA					Prot	NA	Perm
Protected Phases		4		3	8					1	6	
Permitted Phases			4									6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		4	4	3	8					1	6	6
Switch Phase												
Minimum Initial (s)		5.0	5.0	5.0	5.0					5.0	5.0	5.0
Minimum Split (s)		34.6	34.6	9.5	28.4					9.5	9.5	9.5
Total Split (s)		55.0	55.0	13.4	68.4					31.6	31.6	31.6
Total Split (%)		55.0%	55.0%	13.4%	68.4%					31.6%	31.6%	31.6%
Maximum Green (s)		50.5	50.5	8.9	63.9					27.1	27.1	27.1
Yellow Time (s)		3.5	3.5	3.5	3.5					3.5	3.5	3.5
All-Red Time (s)		1.0	1.0	1.0	1.0					1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Lost Time (s)		4.5	4.5	4.5	4.5					4.5	4.5	4.5
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Recall Mode		None	None	None	None					None	Max	Max
Walk Time (s)		7.0	7.0		7.0							
Flash Dont Walk (s)		23.1	23.1		16.9							
Pedestrian Calls (#/hr)		0	0		0							
Act Effct Green (s)		50.5	50.5	8.9	63.9					27.1	27.1	27.1
Actuated g/C Ratio		0.50	0.50	0.09	0.64					0.27	0.27	0.27
v/c Ratio		1.04	0.37	0.96	0.54					0.45	1.09	1.03
Control Delay		59.5	10.8	89.1	11.1					34.0	97.9	81.2
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Delay		59.5	10.8	89.1	11.1					34.0	97.9	81.2
LOS		E	B	F	B					C	F	F
Approach Delay		52.4			26.1						80.0	
Approach LOS		D			C						F	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Natural Cycle: 130	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.09	
Intersection Signal Delay: 50.9	Intersection LOS: D
Intersection Capacity Utilization 85.0%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 11: I-215 SB On-Ramp/I-215 SB Off-Ramp & Los Alamos Rd

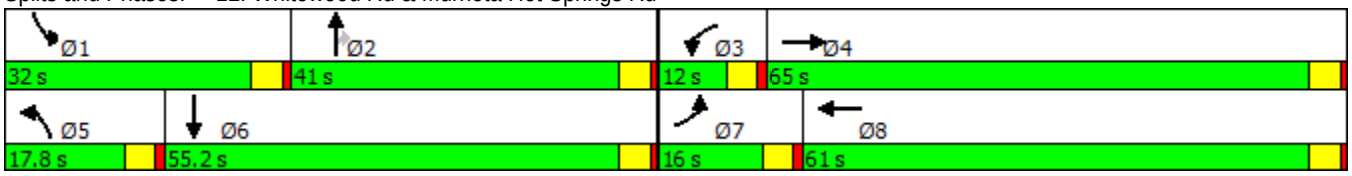


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	176	2070	89	113	2008	442	75	388	216	467	198	121
Future Volume (vph)	176	2070	89	113	2008	442	75	388	216	467	198	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	215		0	150		0	150		0	225		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.994			0.973				0.850		0.943	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	5055	0	1770	4948	0	1770	3539	1583	1770	3337	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	5055	0	1770	4948	0	1770	3539	1583	1770	3337	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			37				109		94	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		764			996			580			564	
Travel Time (s)		17.4			22.6			13.2			12.8	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	187	2202	95	120	2136	470	80	413	230	497	211	129
Shared Lane Traffic (%)												
Lane Group Flow (vph)	187	2297	0	120	2606	0	80	413	230	497	340	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	26.6		9.5	32.6		9.5	38.6	38.6	9.5	38.9	
Total Split (s)	16.0	65.0		12.0	61.0		17.8	41.0	41.0	32.0	55.2	
Total Split (%)	10.7%	43.3%		8.0%	40.7%		11.9%	27.3%	27.3%	21.3%	36.8%	
Maximum Green (s)	11.5	60.5		7.5	56.5		13.3	36.5	36.5	27.5	50.7	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0			7.0	7.0		7.0	
Flash Dont Walk (s)		15.1			21.1			27.1	27.1		27.4	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effct Green (s)	11.5	60.5		7.5	56.5		11.3	36.5	36.5	27.5	52.7	
Actuated g/C Ratio	0.08	0.40		0.05	0.38		0.08	0.24	0.24	0.18	0.35	
v/c Ratio	1.39	1.13		1.36	1.38		0.61	0.48	0.49	1.53	0.28	
Control Delay	260.2	104.6		270.0	211.2		85.8	50.8	29.0	294.9	25.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	260.2	104.6		270.0	211.2		85.8	50.8	29.0	294.9	25.8	
LOS	F	F		F	F		F	D	C	F	C	
Approach Delay		116.3			213.8			47.7			185.6	
Approach LOS		F			F			D			F	

Intersection Summary	
Area Type:	Other
Cycle Length: 150	
Actuated Cycle Length: 150	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.53	
Intersection Signal Delay: 156.8	Intersection LOS: F
Intersection Capacity Utilization 110.0%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 12: Whitewood Rd & Murrieta Hot Springs Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	139	842	82	796	820	126	139	195	640	128	49	140
Future Volume (vph)	139	842	82	796	820	126	139	195	640	128	49	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	225		0	180		0	50		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.987			0.980			0.885			0.889	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	5019	0	1770	4984	0	1770	3132	0	1770	3146	0
Flt Permitted	0.950			0.950			0.620			0.137		
Satd. Flow (perm)	1770	5019	0	1770	4984	0	1155	3132	0	255	3146	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			26			530			149	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		471			2233			1168			1110	
Travel Time (s)		10.7			50.8			26.5			25.2	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	148	896	87	847	872	134	148	207	681	136	52	149
Shared Lane Traffic (%)												
Lane Group Flow (vph)	148	983	0	847	1006	0	148	888	0	136	201	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	32.1		9.5	9.5		38.6	38.6		9.5	9.5	
Total Split (s)	30.0	37.0		39.0	46.0		44.0	44.0		44.0	44.0	
Total Split (%)	25.0%	30.8%		32.5%	38.3%		36.7%	36.7%		36.7%	36.7%	
Maximum Green (s)	25.5	32.5		34.5	41.5		39.5	39.5		39.5	39.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)		7.0					7.0	7.0				
Flash Dont Walk (s)		20.6					27.1	27.1				
Pedestrian Calls (#/hr)		0					0	0				
Act Effct Green (s)	15.1	29.3		34.5	48.8		39.5	39.5		39.5	39.5	
Actuated g/C Ratio	0.13	0.25		0.30	0.42		0.34	0.34		0.34	0.34	
v/c Ratio	0.65	0.78		1.62	0.48		0.38	0.63		1.60	0.17	
Control Delay	61.8	44.8		318.4	25.5		33.7	14.8		344.3	8.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	61.8	44.8		318.4	25.5		33.7	14.8		344.3	8.9	
LOS	E	D		F	C		C	B		F	A	
Approach Delay		47.1			159.4			17.5			144.3	
Approach LOS		D			F			B			F	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 116.9	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.62	
Intersection Signal Delay: 95.3	Intersection LOS: F
Intersection Capacity Utilization 110.4%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 13: Nutmeg St & Clinton Keith Rd

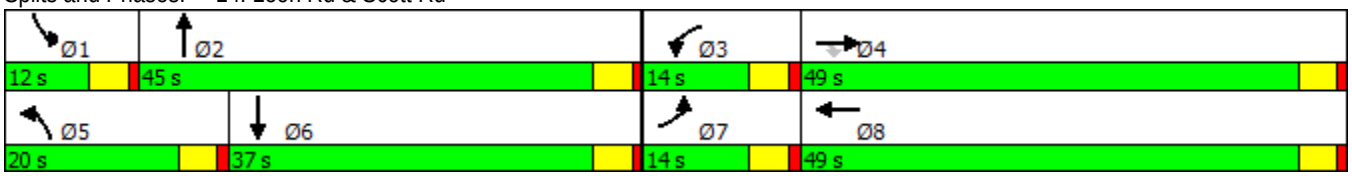
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	335	316	16	346	22	137	55	35	12	27	10
Future Volume (vph)	16	335	316	16	346	22	137	55	35	12	27	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.97	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.991			0.942			0.959	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	5085	1583	1770	5040	0	3433	3334	0	1770	3394	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	5085	1583	1770	5040	0	3433	3334	0	1770	3394	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			336		9			37			11	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		966			752			675			676	
Travel Time (s)		22.0			17.1			15.3			15.4	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	17	356	336	17	368	23	146	59	37	13	29	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	17	356	336	17	391	0	146	96	0	13	40	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									
Detector Phase	7	4	4	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	9.5	28.5	28.5	9.5	28.5		9.5	33.5		9.5	33.5	
Total Split (s)	14.0	49.0	49.0	14.0	49.0		20.0	45.0		12.0	37.0	
Total Split (%)	11.7%	40.8%	40.8%	11.7%	40.8%		16.7%	37.5%		10.0%	30.8%	
Maximum Green (s)	9.5	44.5	44.5	9.5	44.5		15.5	40.5		7.5	32.5	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Walk Time (s)		7.0	7.0		7.0			7.0			7.0	
Flash Dont Walk (s)		17.0	17.0		17.0			22.0			22.0	
Pedestrian Calls (#/hr)		0	0		0			0			0	
Act Effct Green (s)	6.5	10.7	10.7	6.5	10.7		7.8	14.0		6.4	6.5	
Actuated g/C Ratio	0.17	0.28	0.28	0.17	0.28		0.21	0.37		0.17	0.17	
v/c Ratio	0.06	0.25	0.49	0.06	0.27		0.21	0.08		0.04	0.07	
Control Delay	18.8	12.4	5.0	18.8	12.3		16.6	8.9		18.8	15.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	18.8	12.4	5.0	18.8	12.3		16.6	8.9		18.8	15.2	
LOS	B	B	A	B	B		B	A		B	B	
Approach Delay		9.1			12.5			13.6			16.1	
Approach LOS		A			B			B			B	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 37.7
Natural Cycle: 85
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.49
Intersection Signal Delay: 11.1 — Intersection LOS: B
Intersection Capacity Utilization 39.1% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 14: Leon Rd & Scott Rd

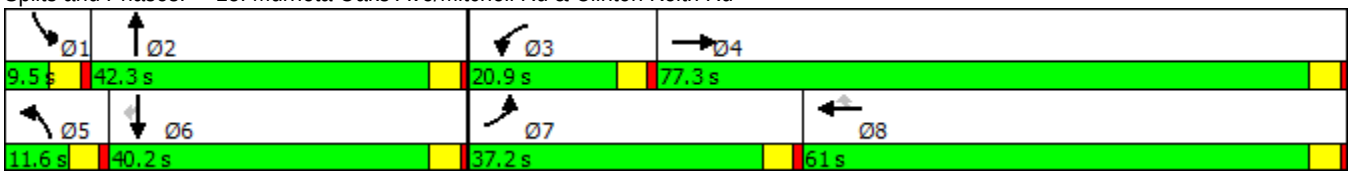


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	398	1870	27	137	1957	10	33	10	115	10	10	617
Future Volume (vph)	398	1870	27	137	1957	10	33	10	115	10	10	617
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		210	0		0	200		200
Storage Lanes	1		0	1		1	1		0	1		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Frt		0.998				0.850		0.862				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	5075	0	1770	5085	1583	1770	1606	0	1770	1863	2787
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	5075	0	1770	5085	1583	1770	1606	0	1770	1863	2787
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				109		120				643
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1884			2845			958			1018	
Travel Time (s)		42.8			64.7			21.8			23.1	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	415	1948	28	143	2039	10	34	10	120	10	10	643
Shared Lane Traffic (%)												
Lane Group Flow (vph)	415	1976	0	143	2039	10	34	130	0	10	10	643
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	26.1		9.5	35.5	35.5	9.5	41.5		9.5	38.4	38.4
Total Split (s)	37.2	77.3		20.9	61.0	61.0	11.6	42.3		9.5	40.2	40.2
Total Split (%)	24.8%	51.5%		13.9%	40.7%	40.7%	7.7%	28.2%		6.3%	26.8%	26.8%
Maximum Green (s)	32.7	72.8		16.4	56.5	56.5	7.1	37.8		5.0	35.7	35.7
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	Max		None	Max	Max
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		14.6			24.0	24.0		30.0			26.9	26.9
Pedestrian Calls (#/hr)		0			0	0		0			0	0
Act Effct Green (s)	32.7	74.2		15.1	56.5	56.5	6.7	41.6		5.0	36.2	36.2
Actuated g/C Ratio	0.22	0.50		0.10	0.38	0.38	0.05	0.28		0.03	0.24	0.24
v/c Ratio	1.06	0.78		0.79	1.05	0.01	0.42	0.24		0.17	0.02	0.55
Control Delay	117.2	33.5		94.3	79.2	0.0	85.8	9.8		77.0	44.1	5.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	117.2	33.5		94.3	79.2	0.0	85.8	9.8		77.0	44.1	5.1
LOS	F	C		F	E	A	F	A		E	D	A
Approach Delay		48.0			79.8			25.6			6.8	
Approach LOS		D			E			C			A	

Intersection Summary	
Area Type: Other	
Cycle Length: 150	
Actuated Cycle Length: 148.1	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.06	
Intersection Signal Delay: 55.2	Intersection LOS: E
Intersection Capacity Utilization 79.6%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 15: Murrieta Oaks Ave/Mitchell Rd & Clinton Keith Rd

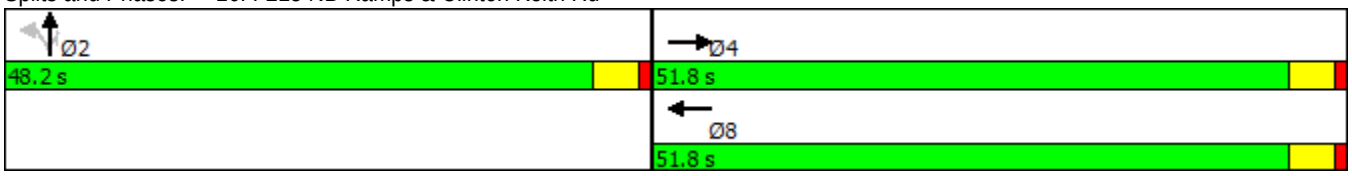


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1656	533	0	2027	93	576	0	599	0	0	0
Future Volume (vph)	0	1656	533	0	2027	93	576	0	599	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		160	0		0	0		0	0		0
Storage Lanes	0		1	0		1	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Frt			0.850			0.850		0.986	0.850			
Flt Protected								0.957				
Satd. Flow (prot)	0	5085	1583	0	5085	1583	0	1670	1504	0	0	0
Flt Permitted								0.957				
Satd. Flow (perm)	0	5085	1583	0	5085	1583	0	1670	1504	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			234			65		16	16			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2845			3447			1631			722	
Travel Time (s)		64.7			78.3			37.1			16.4	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	0	1995	642	0	2442	112	694	0	722	0	0	0
Shared Lane Traffic (%)									10%			
Lane Group Flow (vph)	0	1995	642	0	2442	112	0	766	650	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2	1		2	1	1	2	1			
Detector Template		Thru	Right		Thru	Right	Left	Thru	Right			
Leading Detector (ft)		100	20		100	20	20	100	20			
Trailing Detector (ft)		0	0		0	0	0	0	0			
Detector 1 Position(ft)		0	0		0	0	0	0	0			
Detector 1 Size(ft)		6	20		6	20	20	6	20			
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0			
Detector 1 Queue (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0			
Detector 1 Delay (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0			
Detector 2 Position(ft)		94			94			94				
Detector 2 Size(ft)		6			6			6				
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				
Turn Type		NA	Free		NA	Free	Perm	NA	Perm			
Protected Phases		4			8			2				
Permitted Phases			Free			Free	2		2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		4			8		2	2	2			
Switch Phase												
Minimum Initial (s)		5.0			5.0		5.0	5.0	5.0			
Minimum Split (s)		43.5			9.5		9.5	9.5	9.5			
Total Split (s)		51.8			51.8		48.2	48.2	48.2			
Total Split (%)		51.8%			51.8%		48.2%	48.2%	48.2%			
Maximum Green (s)		47.3			47.3		43.7	43.7	43.7			
Yellow Time (s)		3.5			3.5		3.5	3.5	3.5			
All-Red Time (s)		1.0			1.0		1.0	1.0	1.0			
Lost Time Adjust (s)		0.0			0.0			0.0	0.0			
Total Lost Time (s)		4.5			4.5			4.5	4.5			
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0			
Recall Mode		None			None		Max	Max	Max			
Walk Time (s)		7.0										
Flash Dont Walk (s)		32.0										
Pedestrian Calls (#/hr)		0										
Act Effct Green (s)		47.3	100.0		47.3	100.0		43.7	43.7			
Actuated g/C Ratio		0.47	1.00		0.47	1.00		0.44	0.44			
v/c Ratio		0.83	0.41		1.02	0.07		1.04	0.98			
Control Delay		26.7	0.8		49.3	0.1		72.0	57.9			
Queue Delay		0.0	0.0		0.0	0.0		0.0	0.0			
Total Delay		26.7	0.8		49.3	0.1		72.0	57.9			
LOS		C	A		D	A		E	E			
Approach Delay		20.4			47.1			65.6				
Approach LOS		C			D			E				

Intersection Summary	
Area Type: Other	
Cycle Length: 100	
Actuated Cycle Length: 100	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.04	
Intersection Signal Delay: 40.4	Intersection LOS: D
Intersection Capacity Utilization 90.8%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 16: I-215 NB Ramps & Clinton Keith Rd

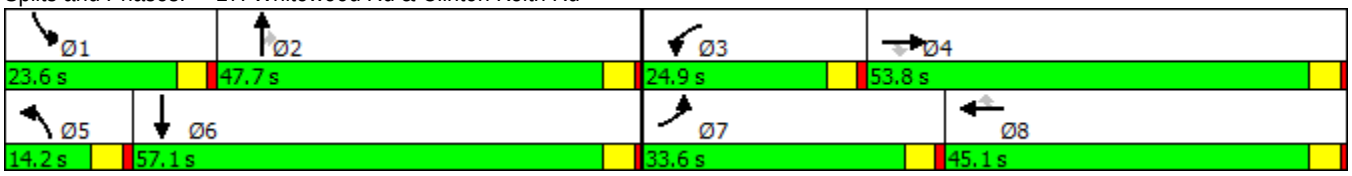


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	614	1101	220	264	1282	318	182	693	380	396	849	272
Future Volume (vph)	614	1101	220	264	1282	318	182	693	380	396	849	272
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	260		0	200		150	310		0	100		0
Storage Lanes	2		1	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	0.95
Frt			0.850			0.850			0.850		0.964	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3412	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3412	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			164			156			283		32	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3447			4370			3330			2871	
Travel Time (s)		78.3			99.3			75.7			65.3	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	714	1280	256	307	1491	370	212	806	442	460	987	316
Shared Lane Traffic (%)												
Lane Group Flow (vph)	714	1280	256	307	1491	370	212	806	442	460	1303	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	29.2	29.2	29.2	9.5	9.5	9.5	9.5	46.4	46.4	9.5	43.5	
Total Split (s)	33.6	53.8	53.8	24.9	45.1	45.1	14.2	47.7	47.7	23.6	57.1	
Total Split (%)	22.4%	35.9%	35.9%	16.6%	30.1%	30.1%	9.5%	31.8%	31.8%	15.7%	38.1%	
Maximum Green (s)	29.1	49.3	49.3	20.4	40.6	40.6	9.7	43.2	43.2	19.1	52.6	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	
Walk Time (s)	7.0	7.0	7.0					7.0	7.0		7.0	
Flash Dont Walk (s)	17.7	17.7	17.7					34.9	34.9		32.0	
Pedestrian Calls (#/hr)	0	0	0					0	0		0	
Act Effct Green (s)	29.1	51.7	51.7	18.0	40.6	40.6	9.7	43.2	43.2	19.1	52.6	
Actuated g/C Ratio	0.19	0.34	0.34	0.12	0.27	0.27	0.06	0.29	0.29	0.13	0.35	
v/c Ratio	1.07	0.73	0.39	0.75	1.08	0.68	0.95	0.79	0.67	1.05	1.07	
Control Delay	111.7	46.4	15.3	75.3	100.9	34.8	118.4	55.9	21.8	118.7	91.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	111.7	46.4	15.3	75.3	100.9	34.8	118.4	55.9	21.8	118.7	91.8	
LOS	F	D	B	E	F	C	F	E	C	F	F	
Approach Delay		63.6			86.0			54.7			98.8	
Approach LOS		E			F			D			F	

Intersection Summary	
Area Type:	Other
Cycle Length: 150	
Actuated Cycle Length: 150	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.08	
Intersection Signal Delay: 76.4	Intersection LOS: E
Intersection Capacity Utilization 94.6%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 17: Whitewood Rd & Clinton Keith Rd

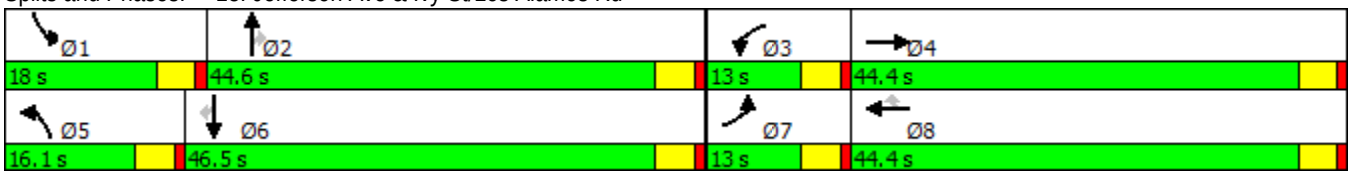


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	129	346	154	131	187	371	181	1768	500	402	1190	57
Future Volume (vph)	129	346	154	131	187	371	181	1768	500	402	1190	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		0	205		0	230		215	250		220
Storage Lanes	1		0	1		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt		0.954				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3376	0	1770	3539	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3376	0	1770	3539	1583	3433	5085	1583	3433	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		63				223			333			95
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1401			1395			2768			2782	
Travel Time (s)		31.8			31.7			62.9			63.2	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	133	357	159	135	193	382	187	1823	515	414	1227	59
Shared Lane Traffic (%)												
Lane Group Flow (vph)	133	516	0	135	193	382	187	1823	515	414	1227	59
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	44.4		9.5	44.4	44.4	9.5	38.4	38.4	9.5	34.4	34.4
Total Split (s)	13.0	44.4		13.0	44.4	44.4	16.1	44.6	44.6	18.0	46.5	46.5
Total Split (%)	10.8%	37.0%		10.8%	37.0%	37.0%	13.4%	37.2%	37.2%	15.0%	38.8%	38.8%
Maximum Green (s)	8.5	39.9		8.5	39.9	39.9	11.6	40.1	40.1	13.5	42.0	42.0
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		32.9			32.9	32.9		26.9	26.9		22.9	22.9
Pedestrian Calls (#/hr)		0			0	0		0	0		0	0
Act Effct Green (s)	8.5	20.5		8.5	20.5	20.5	10.2	40.3	40.3	13.6	43.6	43.6
Actuated g/C Ratio	0.08	0.20		0.08	0.20	0.20	0.10	0.40	0.40	0.13	0.43	0.43
v/c Ratio	0.89	0.70		0.91	0.27	0.77	0.54	0.90	0.62	0.90	0.56	0.08
Control Delay	98.1	37.7		100.8	34.1	25.8	50.1	36.4	12.4	67.6	23.7	1.7
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	98.1	37.7		100.8	34.1	25.8	50.1	36.4	12.4	67.6	23.7	1.7
LOS	F	D		F	C	C	D	D	B	E	C	A
Approach Delay		50.1			42.3			32.5			33.6	
Approach LOS		D			D			C			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 100.9	
Natural Cycle: 135	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 36.2	Intersection LOS: D
Intersection Capacity Utilization 82.4%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 18: Jefferson Ave & Ivy St/Los Alamos Rd

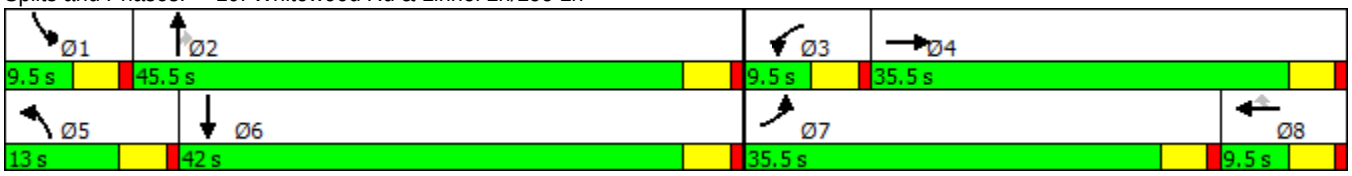


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	200	14	85	10	10	10	77	1089	10	33	681	149
Future Volume (vph)	200	14	85	10	10	10	77	1089	10	33	681	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	135		0	0		0	205		0	205		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.871				0.850			0.850		0.973	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3083	0	1770	3539	1583	1770	3539	1583	1770	3444	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3083	0	1770	3539	1583	1770	3539	1583	1770	3444	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		93				164			164		30	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1415			1455			2871			2884	
Travel Time (s)		32.2			33.1			65.3			65.5	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	220	15	93	11	11	11	85	1197	11	36	748	164
Shared Lane Traffic (%)												
Lane Group Flow (vph)	220	108	0	11	11	11	85	1197	11	36	912	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	35.5	35.5		9.5	9.5	9.5	9.5	27.4	27.4	9.5	32.1	
Total Split (s)	35.5	35.5		9.5	9.5	9.5	13.0	45.5	45.5	9.5	42.0	
Total Split (%)	35.5%	35.5%		9.5%	9.5%	9.5%	13.0%	45.5%	45.5%	9.5%	42.0%	
Maximum Green (s)	31.0	31.0		5.0	5.0	5.0	8.5	41.0	41.0	5.0	37.5	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)	7.0	7.0						7.0	7.0		7.0	
Flash Dont Walk (s)	24.0	24.0						15.9	15.9		20.6	
Pedestrian Calls (#/hr)	0	0						0	0		0	
Act Effct Green (s)	14.9	16.5		5.1	5.1	5.1	7.9	44.8	44.8	5.1	40.2	
Actuated g/C Ratio	0.19	0.21		0.07	0.07	0.07	0.10	0.58	0.58	0.07	0.52	
v/c Ratio	0.65	0.15		0.09	0.05	0.04	0.47	0.58	0.01	0.31	0.51	
Control Delay	39.1	8.2		41.0	39.5	0.3	45.2	15.0	0.0	46.0	15.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	39.1	8.2		41.0	39.5	0.3	45.2	15.0	0.0	46.0	15.7	
LOS	D	A		D	D	A	D	B	A	D	B	
Approach Delay		29.0			26.9			16.8			16.9	
Approach LOS		C			C			B			B	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 77.4	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 18.5	Intersection LOS: B
Intersection Capacity Utilization 63.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 19: Whitewood Rd & Linnel Ln/Lee Ln

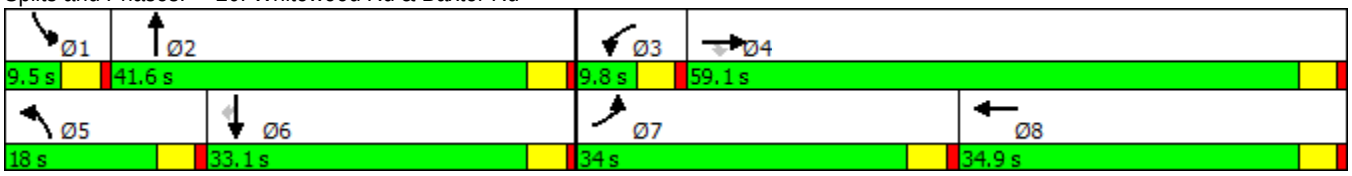


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	598	14	469	15	12	10	251	984	22	10	407	466
Future Volume (vph)	598	14	469	15	12	10	251	984	22	10	407	466
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	215		0	120		0	220		0	200		0
Storage Lanes	1		1	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850		0.931			0.997				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	3295	0	1770	3529	0	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1863	1583	1770	3295	0	1770	3529	0	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			376		11			2				507
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2823			874			2884			792	
Travel Time (s)		64.2			19.9			65.5			18.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	650	15	510	16	13	11	273	1070	24	11	442	507
Shared Lane Traffic (%)												
Lane Group Flow (vph)	650	15	510	16	24	0	273	1094	0	11	442	507
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	35.5	35.5	9.5	34.9		9.5	32.1		9.5	32.1	32.1
Total Split (s)	34.0	59.1	59.1	9.8	34.9		18.0	41.6		9.5	33.1	33.1
Total Split (%)	28.3%	49.3%	49.3%	8.2%	29.1%		15.0%	34.7%		7.9%	27.6%	27.6%
Maximum Green (s)	29.5	54.6	54.6	5.3	30.4		13.5	37.1		5.0	28.6	28.6
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	Max		None	Max	Max
Walk Time (s)		7.0	7.0		7.0			7.0			7.0	7.0
Flash Dont Walk (s)		24.0	24.0		23.4			20.6			20.6	20.6
Pedestrian Calls (#/hr)		0	0		0			0			0	0
Act Effct Green (s)	29.6	30.1	30.1	5.3	6.0		13.5	45.0		5.0	28.7	28.7
Actuated g/C Ratio	0.33	0.34	0.34	0.06	0.07		0.15	0.50		0.06	0.32	0.32
v/c Ratio	1.11	0.02	0.65	0.15	0.10		1.02	0.62		0.11	0.39	0.60
Control Delay	102.3	21.9	11.6	45.8	30.0		101.2	19.5		45.3	25.7	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	102.3	21.9	11.6	45.8	30.0		101.2	19.5		45.3	25.7	5.8
LOS	F	C	B	D	C		F	B		D	C	A
Approach Delay		61.9			36.3			35.9			15.4	
Approach LOS		E			D			D			B	

Intersection Summary	
Area Type: Other	
Cycle Length: 120	
Actuated Cycle Length: 89.5	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.11	
Intersection Signal Delay: 39.0	Intersection LOS: D
Intersection Capacity Utilization 83.1%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 20: Whitewood Rd & Baxter Rd



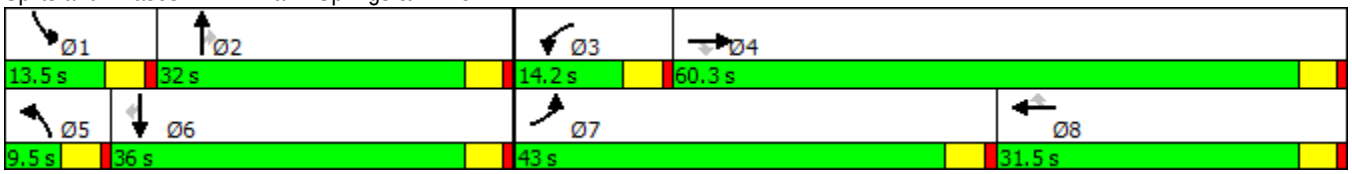
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	559	264	14	62	195	139	10	267	53	124	269	676
Future Volume (vph)	559	264	14	62	195	139	10	267	53	124	269	676
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			95			139			136			676
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		450			400			650			700	
Travel Time (s)		10.2			9.1			14.8			15.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	559	264	14	62	195	139	10	267	53	124	269	676
Shared Lane Traffic (%)												
Lane Group Flow (vph)	559	264	14	62	195	139	10	267	53	124	269	676
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	9.5	31.5	31.5	9.5	31.5	31.5	9.5	31.5	31.5	9.5	31.5	31.5
Total Split (s)	43.0	60.3	60.3	14.2	31.5	31.5	9.5	32.0	32.0	13.5	36.0	36.0
Total Split (%)	35.8%	50.3%	50.3%	11.8%	26.3%	26.3%	7.9%	26.7%	26.7%	11.3%	30.0%	30.0%
Maximum Green (s)	38.5	55.8	55.8	9.7	27.0	27.0	5.0	27.5	27.5	9.0	31.5	31.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		20.0	20.0		20.0	20.0		20.0	20.0		20.0	20.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	36.2	41.0	41.0	8.2	10.5	10.5	5.1	13.9	13.9	9.1	26.1	26.1
Actuated g/C Ratio	0.41	0.47	0.47	0.09	0.12	0.12	0.06	0.16	0.16	0.10	0.30	0.30
v/c Ratio	0.77	0.16	0.02	0.38	0.46	0.45	0.10	0.48	0.15	0.68	0.26	0.72
Control Delay	32.5	15.9	0.1	47.7	41.4	12.1	47.2	36.9	0.8	60.8	25.6	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.5	15.9	0.1	47.7	41.4	12.1	47.2	36.9	0.8	60.8	25.6	7.3
LOS	C	B	A	D	D	B	D	D	A	E	C	A
Approach Delay		26.7			32.1			31.4			18.1	
Approach LOS		C			C			C			B	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 88.1
Natural Cycle: 115
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 24.6 — Intersection LOS: C
Intersection Capacity Utilization 65.6% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 21: Warm Springs & Linnel Ln



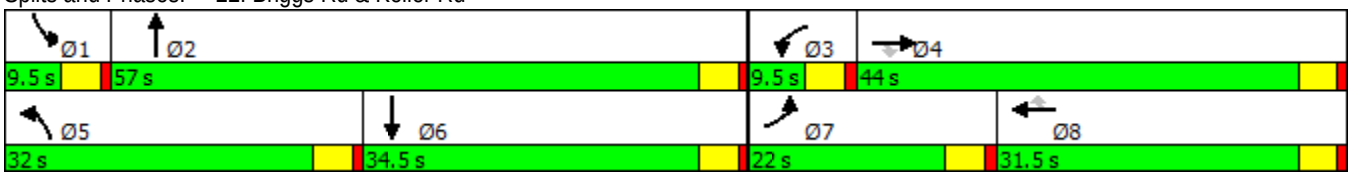
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	230	58	131	10	54	10	373	572	10	10	720	29
Future Volume (vph)	230	58	131	10	54	10	373	572	10	10	720	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.997			0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	3529	0	1770	3518	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	3529	0	1770	3518	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			136			177		2			3	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		4817			1737			695			730	
Travel Time (s)		109.5			39.5			15.8			16.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	230	58	131	10	54	10	373	572	10	10	720	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	230	58	131	10	54	10	373	582	0	10	749	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Detector Phase	7	4	4	3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	9.5	31.5	31.5	9.5	31.5	31.5	9.5	31.5		9.5	31.5	
Total Split (s)	22.0	44.0	44.0	9.5	31.5	31.5	32.0	57.0		9.5	34.5	
Total Split (%)	18.3%	36.7%	36.7%	7.9%	26.3%	26.3%	26.7%	47.5%		7.9%	28.8%	
Maximum Green (s)	17.5	39.5	39.5	5.0	27.0	27.0	27.5	52.5		5.0	30.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Walk Time (s)		7.0	7.0		7.0	7.0		7.0			7.0	
Flash Dont Walk (s)		20.0	20.0		20.0	20.0		20.0			20.0	
Pedestrian Calls (#/hr)		0	0		0	0		0			0	
Act Effct Green (s)	16.7	23.7	23.7	5.2	7.0	7.0	25.3	54.2		5.2	26.0	
Actuated g/C Ratio	0.18	0.26	0.26	0.06	0.08	0.08	0.28	0.60		0.06	0.29	
v/c Ratio	0.71	0.06	0.25	0.10	0.20	0.04	0.76	0.28		0.10	0.74	
Control Delay	50.6	28.1	6.9	48.0	45.0	0.2	43.0	10.3		48.0	35.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	50.6	28.1	6.9	48.0	45.0	0.2	43.0	10.3		48.0	35.4	
LOS	D	C	A	D	D	A	D	B		D	D	
Approach Delay		33.8			39.3			23.0			35.6	
Approach LOS		C			D			C			D	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 90.7
Natural Cycle: 105
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 29.9 — Intersection LOS: C
Intersection Capacity Utilization 72.1% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 22: Briggs Rd & Keller Rd

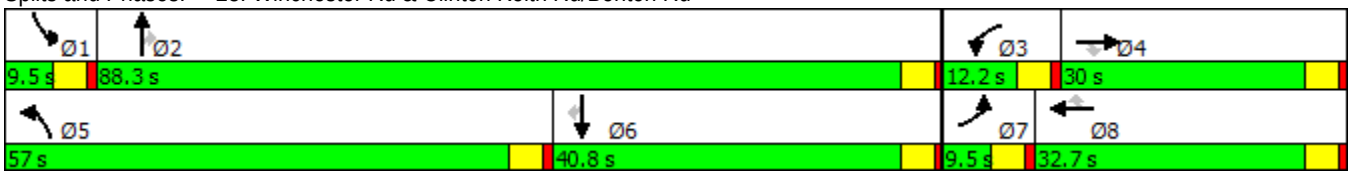


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	325	1181	164	366	10	1231	1777	181	10	1107	10
Future Volume (vph)	10	325	1181	164	366	10	1231	1777	181	10	1107	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		150	0		0	0		0	0		0
Storage Lanes	2		2	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.88	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	2787	3433	3539	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3539	2787	3433	3539	1583	3433	5085	1583	3433	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			1036			117			181			117
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		4370			1699			998			766	
Travel Time (s)		99.3			38.6			22.7			17.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	10	325	1181	164	366	10	1231	1777	181	10	1107	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	10	325	1181	164	366	10	1231	1777	181	10	1107	10
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	9.5	30.0	30.0	12.2	32.7	32.7	57.0	88.3	88.3	9.5	40.8	40.8
Total Split (%)	6.8%	21.4%	21.4%	8.7%	23.4%	23.4%	40.7%	63.1%	63.1%	6.8%	29.1%	29.1%
Maximum Green (s)	5.0	25.5	25.5	7.7	28.2	28.2	52.5	83.8	83.8	5.0	36.3	36.3
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	5.0	23.8	23.8	7.7	34.2	34.2	51.2	90.2	90.2	5.0	36.4	36.4
Actuated g/C Ratio	0.04	0.17	0.17	0.06	0.25	0.25	0.37	0.66	0.66	0.04	0.27	0.27
v/c Ratio	0.08	0.53	0.88	0.85	0.42	0.02	0.96	0.53	0.16	0.08	0.82	0.02
Control Delay	66.7	55.1	16.1	99.7	45.6	0.1	59.4	13.6	1.8	66.7	53.8	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.7	55.1	16.1	99.7	45.6	0.1	59.4	13.6	1.8	66.7	53.8	0.1
LOS	E	E	B	F	D	A	E	B	A	E	D	A
Approach Delay		24.8			61.2			30.6			53.4	
Approach LOS		C			E			C			D	

Intersection Summary	
Area Type: Other	
Cycle Length: 140	
Actuated Cycle Length: 137.1	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 35.8	Intersection LOS: D
Intersection Capacity Utilization 85.8%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 23: Winchester Rd & Clinton Keith Rd/Benton Rd



FUTURE YEAR 2035 WITH PROJECT CONDITIONS WITH IMPROVEMENTS

1: Jefferson Ave & Murrieta Hot Springs Rd

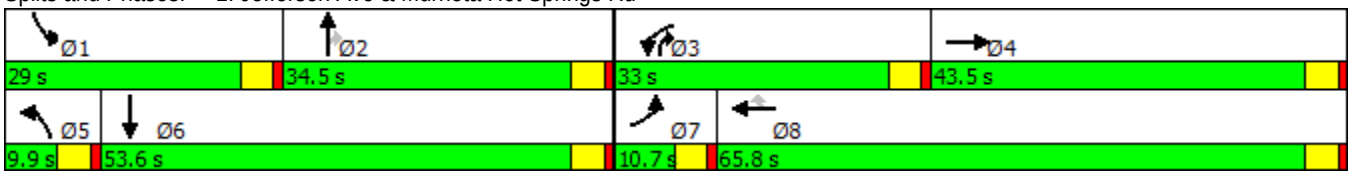
Timing Plan: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	67	12	973	87	299	13	455	253	814	985	10
Future Volume (vph)	23	67	12	973	87	299	13	455	253	814	985	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		265	0		280	185		0
Storage Lanes	1		0	2		1	1		2	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	0.97	0.91	1.00	1.00	0.91	0.88	0.97	0.91	0.91
Frt		0.977				0.850			0.850		0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	4968	0	3433	5085	1583	1770	5085	2787	3433	5075	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	4968	0	3433	5085	1583	1770	5085	2787	3433	5075	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13				325			275		1	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		687			1412			1630			2768	
Travel Time (s)		15.6			32.1			37.0			62.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	25	73	13	1058	95	325	14	495	275	885	1071	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	25	86	0	1058	95	325	14	495	275	885	1082	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		48			48			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases						8			2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	3	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	43.5		9.5	44.4	44.4	9.5	33.8	9.5	9.5	22.5	
Total Split (s)	10.7	43.5		33.0	65.8	65.8	9.9	34.5	33.0	29.0	53.6	
Total Split (%)	7.6%	31.1%		23.6%	47.0%	47.0%	7.1%	24.6%	23.6%	20.7%	38.3%	
Maximum Green (s)	6.2	39.0		28.5	61.3	61.3	5.4	30.0	28.5	24.5	49.1	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max	None	None	Max	
Walk Time (s)		7.0			7.0	7.0		7.0				
Flash Dont Walk (s)		32.0			32.9	32.9		22.3				
Pedestrian Calls (#/hr)		0			0	0		0				
Act Effct Green (s)	6.1	7.0		28.5	33.6	33.6	5.4	30.0	63.0	24.5	55.1	
Actuated g/C Ratio	0.06	0.06		0.26	0.31	0.31	0.05	0.28	0.58	0.23	0.51	
v/c Ratio	0.25	0.26		1.17	0.06	0.45	0.16	0.35	0.16	1.14	0.42	
Control Delay	55.6	42.6		124.4	27.9	5.7	53.8	32.2	1.5	115.8	17.9	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	55.6	42.6		124.4	27.9	5.7	53.8	32.2	1.5	115.8	17.9	
LOS	E	D		F	C	A	D	C	A	F	B	
Approach Delay		45.5			92.1			21.8			61.9	
Approach LOS		D			F			C			E	

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 108	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.17	
Intersection Signal Delay: 64.5	Intersection LOS: E
Intersection Capacity Utilization 77.7%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 1: Jefferson Ave & Murrieta Hot Springs Rd

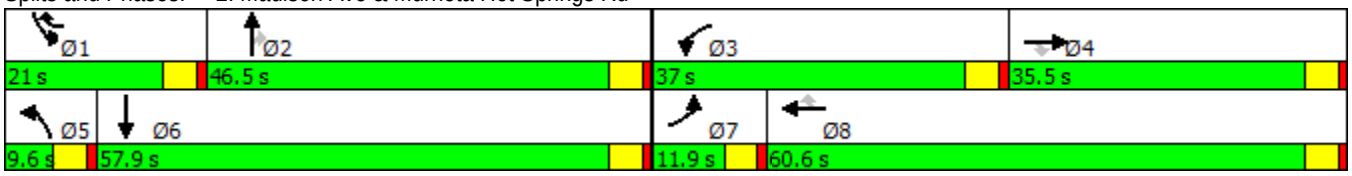


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	858	148	718	1012	337	50	218	266	350	465	537
Future Volume (vph)	77	858	148	718	1012	337	50	218	266	350	465	537
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	250		0	100		100	165		0
Storage Lanes	2		1	2		1	2		2	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.86	1.00	0.97	0.91	1.00	0.97	0.95	0.88	0.97	0.95	0.95
Frt			0.850			0.850			0.850		0.920	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	6408	1583	3433	5085	1583	3433	3539	2787	3433	3256	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	6408	1583	3433	5085	1583	3433	3539	2787	3433	3256	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			166			341			299		156	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1412			2198			1707			1381	
Travel Time (s)		32.1			50.0			38.8			31.4	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	87	964	166	807	1137	379	56	245	299	393	522	603
Shared Lane Traffic (%)												
Lane Group Flow (vph)	87	964	166	807	1137	379	56	245	299	393	1125	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8	1	5	2		1	6	
Permitted Phases			4			8			2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	1	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	35.5	35.5	9.5	38.4	9.5	9.5	45.2	45.2	9.5	45.2	
Total Split (s)	11.9	35.5	35.5	37.0	60.6	21.0	9.6	46.5	46.5	21.0	57.9	
Total Split (%)	8.5%	25.4%	25.4%	26.4%	43.3%	15.0%	6.9%	33.2%	33.2%	15.0%	41.4%	
Maximum Green (s)	7.4	31.0	31.0	32.5	56.1	16.5	5.1	42.0	42.0	16.5	53.4	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0	7.0		7.0			7.0	7.0		7.0	
Flash Dont Walk (s)		24.0	24.0		26.9			33.7	33.7		33.7	
Pedestrian Calls (#/hr)		0	0		0			0	0		0	
Act Effct Green (s)	7.2	28.9	28.9	32.5	54.2	75.2	5.1	42.0	42.0	16.5	55.4	
Actuated g/C Ratio	0.05	0.21	0.21	0.24	0.39	0.55	0.04	0.30	0.30	0.12	0.40	
v/c Ratio	0.49	0.72	0.36	1.00	0.57	0.37	0.44	0.23	0.28	0.96	0.80	
Control Delay	73.6	54.1	8.5	83.6	34.0	3.5	76.9	36.9	4.4	95.2	37.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	73.6	54.1	8.5	83.6	34.0	3.5	76.9	36.9	4.4	95.2	37.3	
LOS	E	D	A	F	C	A	E	D	A	F	D	
Approach Delay		49.3			46.3			24.5			52.3	
Approach LOS		D			D			C			D	

Intersection Summary	
Area Type: Other	
Cycle Length: 140	
Actuated Cycle Length: 137.9	
Natural Cycle: 135	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.00	
Intersection Signal Delay: 46.2	Intersection LOS: D
Intersection Capacity Utilization 82.2%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 2: Madison Ave & Murrieta Hot Springs Rd



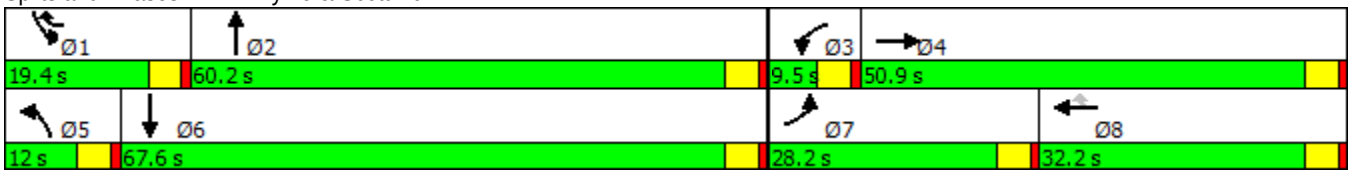
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	104	104	10	71	187	99	1637	10	264	2371	151
Future Volume (vph)	165	104	104	10	71	187	99	1637	10	264	2371	151
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	0.91	0.91	0.97	0.91	0.91
Frt		0.925				0.850		0.999			0.991	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	4704	0	1770	5085	1583	1770	5080	0	3433	5040	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	4704	0	1770	5085	1583	1770	5080	0	3433	5040	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		113				82		1			9	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1266			804			669			738	
Travel Time (s)		28.8			18.3			15.2			16.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	179	113	113	11	77	203	108	1779	11	287	2577	164
Shared Lane Traffic (%)												
Lane Group Flow (vph)	179	226	0	11	77	203	108	1790	0	287	2741	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8	1	5	2		1	6	
Permitted Phases						8						
Detector Phase	7	4		3	8	1	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	9.5	50.9		9.5	9.5	9.5	9.5	41.9		9.5	49.8	
Total Split (s)	28.2	50.9		9.5	32.2	19.4	12.0	60.2		19.4	67.6	
Total Split (%)	20.1%	36.4%		6.8%	23.0%	13.9%	8.6%	43.0%		13.9%	48.3%	
Maximum Green (s)	23.7	46.4		5.0	27.7	14.9	7.5	55.7		14.9	63.1	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max		None	Max	
Walk Time (s)		7.0						7.0			7.0	
Flash Dont Walk (s)		39.4						30.4			38.3	
Pedestrian Calls (#/hr)		0						0			0	
Act Effct Green (s)	16.3	23.9		5.0	7.1	22.9	7.6	57.4		13.7	63.5	
Actuated g/C Ratio	0.15	0.22		0.05	0.06	0.21	0.07	0.52		0.12	0.58	
v/c Ratio	0.68	0.20		0.14	0.23	0.52	0.89	0.68		0.68	0.94	
Control Delay	58.8	17.6		58.0	52.9	27.4	111.0	22.9		55.9	31.3	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	58.8	17.6		58.0	52.9	27.4	111.0	22.9		55.9	31.3	
LOS	E	B		E	D	C	F	C		E	C	
Approach Delay		35.8			35.3			27.9			33.6	
Approach LOS		D			D			C			C	

Intersection Summary

Area Type: Other
Cycle Length: 140
Actuated Cycle Length: 110.3
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 31.9 Intersection LOS: C
Intersection Capacity Utilization 81.7% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 4: Hwy 79 & Scott Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	108	123	142	443	375	37	538	172	121	83	218	288
Future Volume (vph)	108	123	142	443	375	37	538	172	121	83	218	288
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		20	150		0
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850		0.987				0.850		0.915	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3493	0	1770	3539	1583	1770	3238	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3539	1583	1770	3493	0	1770	3539	1583	1770	3238	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			142		7				109		193	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		620			2823			806			5440	
Travel Time (s)		14.1			64.2			18.3			123.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	108	123	142	443	375	37	538	172	121	83	218	288
Shared Lane Traffic (%)												
Lane Group Flow (vph)	108	123	142	443	412	0	538	172	121	83	506	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4						2			

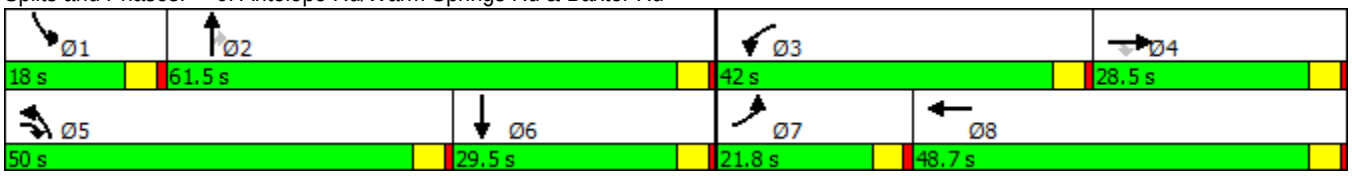
6: Antelope Rd/Warm Springs Rd & Baxter Rd

Timing Plan: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	5	3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	28.5	9.5	9.5	28.5		9.5	34.9	34.9	9.5	28.5	
Total Split (s)	21.8	28.5	50.0	42.0	48.7		50.0	61.5	61.5	18.0	29.5	
Total Split (%)	14.5%	19.0%	33.3%	28.0%	32.5%		33.3%	41.0%	41.0%	12.0%	19.7%	
Maximum Green (s)	17.3	24.0	45.5	37.5	44.2		45.5	57.0	57.0	13.5	25.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None		None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0			7.0	7.0		7.0	
Flash Dont Walk (s)		17.0			17.0			17.0	17.0		17.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effct Green (s)	13.3	10.1	60.1	37.5	34.3		45.5	59.3	59.3	11.2	25.0	
Actuated g/C Ratio	0.10	0.07	0.44	0.28	0.25		0.33	0.44	0.44	0.08	0.18	
v/c Ratio	0.63	0.47	0.18	0.91	0.47		0.91	0.11	0.16	0.57	0.67	
Control Delay	75.0	66.4	3.9	71.7	44.9		64.4	23.9	6.1	75.7	36.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	75.0	66.4	3.9	71.7	44.9		64.4	23.9	6.1	75.7	36.6	
LOS	E	E	A	E	D		E	C	A	E	D	
Approach Delay		45.1			58.8			47.6			42.1	
Approach LOS		D			E			D			D	

Intersection Summary	
Area Type: Other	
Cycle Length: 150	
Actuated Cycle Length: 136.1	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 49.6	Intersection LOS: D
Intersection Capacity Utilization 88.8%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 6: Antelope Rd/Warm Springs Rd & Baxter Rd

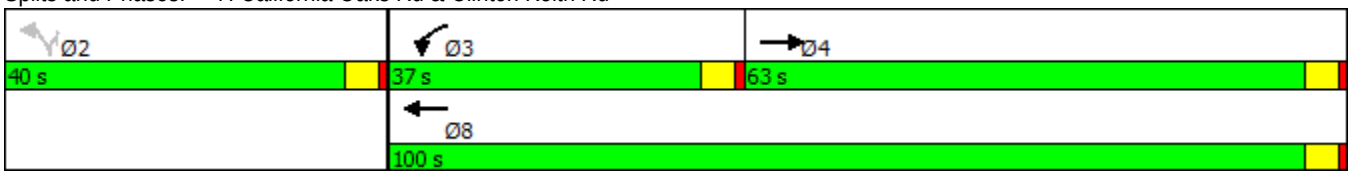


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1535	319	627	1121	243	627
Future Volume (vph)	1535	319	627	1121	243	627
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	225		100	0
Storage Lanes		0	2		1	2
Taper Length (ft)			25		25	
Lane Util. Factor	0.91	0.91	0.97	0.91	1.00	0.88
Frt	0.974					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	4953	0	3433	5085	1770	2787
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	4953	0	3433	5085	1770	2787
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	39					660
Link Speed (mph)	30			30	30	
Link Distance (ft)	2233			3569	625	
Travel Time (s)	50.8			81.1	14.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1616	336	660	1180	256	660
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1952	0	660	1180	256	660
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	24			24	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Number of Detectors	2		1	2	1	1
Detector Template	Thru		Left	Thru	Left	Right
Leading Detector (ft)	100		20	100	20	20
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	6		20	6	20	20
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Prot	NA	Perm	Perm
Protected Phases	4		3	8		
Permitted Phases					2	2

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	4		3	8	2	2
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0
Minimum Split (s)	36.6		9.5	9.5	37.2	37.2
Total Split (s)	63.0		37.0	100.0	40.0	40.0
Total Split (%)	45.0%		26.4%	71.4%	28.6%	28.6%
Maximum Green (s)	58.5		32.5	95.5	35.5	35.5
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5		4.5	4.5	4.5	4.5
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	None	Max	Max
Walk Time (s)	7.0				7.0	7.0
Flash Dont Walk (s)	25.1				25.7	25.7
Pedestrian Calls (#/hr)	0				0	0
Act Effct Green (s)	58.5		30.0	93.0	35.5	35.5
Actuated g/C Ratio	0.43		0.22	0.68	0.26	0.26
v/c Ratio	0.92		0.88	0.34	0.56	0.55
Control Delay	44.6		66.5	9.7	50.3	4.8
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	44.6		66.5	9.7	50.3	4.8
LOS	D		E	A	D	A
Approach Delay	44.6			30.0	17.5	
Approach LOS	D			C	B	

Intersection Summary	
Area Type: Other	
Cycle Length: 140	
Actuated Cycle Length: 137.5	
Natural Cycle: 105	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.92	
Intersection Signal Delay: 33.6	Intersection LOS: C
Intersection Capacity Utilization 79.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 7: California Oaks Rd & Clinton Keith Rd

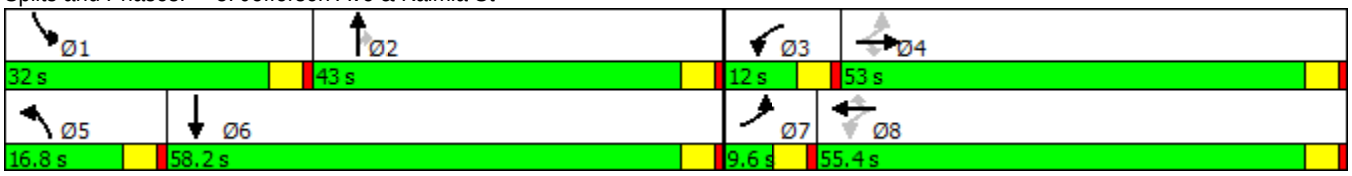


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	759	742	220	627	241	154	535	144	688	1141	49
Future Volume (vph)	26	759	742	220	627	241	154	535	144	688	1141	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		140	235		0	205		0	145		0
Storage Lanes	1		1	1		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.95	1.00	0.97	0.91	1.00	0.97	0.91	0.91
Frt			0.850			0.850			0.850		0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	5085	1583	1770	3539	1583	3433	5085	1583	3433	5055	0
Flt Permitted	0.288			0.215			0.950			0.950		
Satd. Flow (perm)	536	5085	1583	400	3539	1583	3433	5085	1583	3433	5055	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			218			265			117		5	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1399			684			2782			1004	
Travel Time (s)		31.8			15.5			63.2			22.8	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	29	834	815	242	689	265	169	588	158	756	1254	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	834	815	242	689	265	169	588	158	756	1308	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8			2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	44.0	44.0	9.5	34.9	34.9	9.5	38.6	38.6	9.5	39.5	
Total Split (s)	9.6	53.0	53.0	12.0	55.4	55.4	16.8	43.0	43.0	32.0	58.2	
Total Split (%)	6.9%	37.9%	37.9%	8.6%	39.6%	39.6%	12.0%	30.7%	30.7%	22.9%	41.6%	
Maximum Green (s)	5.1	48.5	48.5	7.5	50.9	50.9	12.3	38.5	38.5	27.5	53.7	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		32.5	32.5		23.4	23.4		27.1	27.1		28.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	
Act Effct Green (s)	53.6	48.5	48.5	59.2	54.7	54.7	11.3	38.5	38.5	27.5	54.7	
Actuated g/C Ratio	0.38	0.35	0.35	0.42	0.39	0.39	0.08	0.28	0.28	0.20	0.39	
v/c Ratio	0.12	0.47	1.18	1.00	0.50	0.34	0.61	0.42	0.30	1.12	0.66	
Control Delay	24.3	36.9	126.1	91.2	34.5	4.6	72.0	42.7	13.7	123.5	37.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	24.3	36.9	126.1	91.2	34.5	4.6	72.0	42.7	13.7	123.5	37.0	
LOS	C	D	F	F	C	A	E	D	B	F	D	
Approach Delay		80.0			39.3			43.1			68.7	
Approach LOS		E			D			D			E	

Intersection Summary	
Area Type: Other	
Cycle Length: 140	
Actuated Cycle Length: 140	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.18	
Intersection Signal Delay: 61.9	Intersection LOS: E
Intersection Capacity Utilization 92.5%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 8: Jefferson Ave & Kalmia St

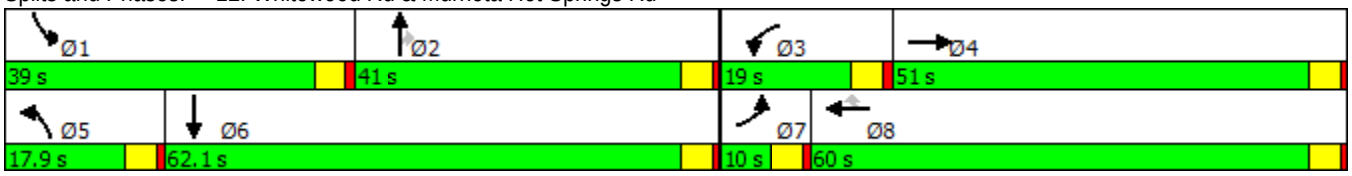


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	1585	51	190	2071	269	76	63	59	462	443	155
Future Volume (vph)	65	1585	51	190	2071	269	76	63	59	462	443	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	215		0	150		0	150		0	225		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.995				0.850			0.850		0.961	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	5060	0	1770	5085	1583	1770	3539	1583	1770	3401	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	5060	0	1770	5085	1583	1770	3539	1583	1770	3401	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				149			142		38	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		764			996			580			564	
Travel Time (s)		17.4			22.6			13.2			12.8	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	69	1686	54	202	2203	286	81	67	63	491	471	165
Shared Lane Traffic (%)												
Lane Group Flow (vph)	69	1740	0	202	2203	286	81	67	63	491	636	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	26.6		9.5	32.6	32.6	9.5	38.6	38.6	9.5	38.9	
Total Split (s)	10.0	51.0		19.0	60.0	60.0	17.9	41.0	41.0	39.0	62.1	
Total Split (%)	6.7%	34.0%		12.7%	40.0%	40.0%	11.9%	27.3%	27.3%	26.0%	41.4%	
Maximum Green (s)	5.5	46.5		14.5	55.5	55.5	13.4	36.5	36.5	34.5	57.6	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		15.1			21.1	21.1		27.1	27.1		27.4	
Pedestrian Calls (#/hr)		0			0	0		0	0		0	
Act Effct Green (s)	5.5	46.5		14.5	55.5	55.5	11.3	36.5	36.5	34.5	59.7	
Actuated g/C Ratio	0.04	0.31		0.10	0.37	0.37	0.08	0.24	0.24	0.23	0.40	
v/c Ratio	1.08	1.11		1.18	1.17	0.42	0.61	0.08	0.13	1.21	0.46	
Control Delay	199.6	105.7		181.6	125.0	18.2	85.8	44.2	0.5	161.9	32.8	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	199.6	105.7		181.6	125.0	18.2	85.8	44.2	0.5	161.9	32.8	
LOS	F	F		F	F	B	F	D	A	F	C	
Approach Delay		109.3			117.9			47.1			89.1	
Approach LOS		F			F			D			F	

Intersection Summary	
Area Type: Other	
Cycle Length: 150	
Actuated Cycle Length: 150	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.21	
Intersection Signal Delay: 107.1	Intersection LOS: F
Intersection Capacity Utilization 88.9%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 12: Whitewood Rd & Murrieta Hot Springs Rd

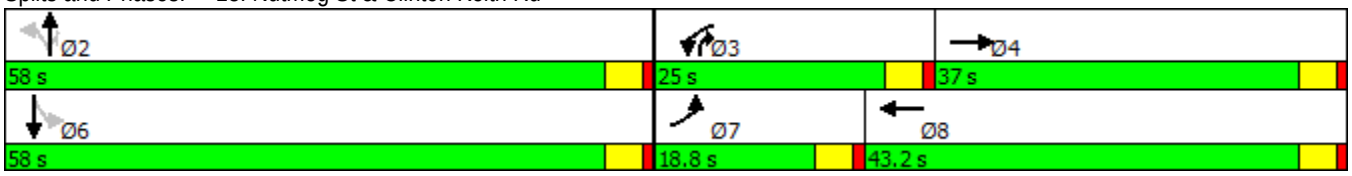


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	666	104	376	749	107	115	44	926	219	89	158
Future Volume (vph)	51	666	104	376	749	107	115	44	926	219	89	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	225		0	180		0	50		0
Storage Lanes	1		0	2		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	0.97	0.91	0.91	1.00	1.00	1.00	1.00	0.95	0.95
Frt		0.980			0.981				0.850		0.904	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	4984	0	3433	4989	0	1770	1863	1583	1770	3199	0
Flt Permitted	0.950			0.950			0.583			0.726		
Satd. Flow (perm)	1770	4984	0	3433	4989	0	1086	1863	1583	1352	3199	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24			23				32		168	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		471			2233			1168			1110	
Travel Time (s)		10.7			50.8			26.5			25.2	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	54	709	111	400	797	114	122	47	985	233	95	168
Shared Lane Traffic (%)												
Lane Group Flow (vph)	54	820	0	400	911	0	122	47	985	233	263	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	7	4		3	8			2	3		6	
Permitted Phases							2		2	6		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		2	2	3	6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	32.1		9.5	9.5		38.6	38.6	9.5	9.5	9.5	
Total Split (s)	18.8	37.0		25.0	43.2		58.0	58.0	25.0	58.0	58.0	
Total Split (%)	15.7%	30.8%		20.8%	36.0%		48.3%	48.3%	20.8%	48.3%	48.3%	
Maximum Green (s)	14.3	32.5		20.5	38.7		53.5	53.5	20.5	53.5	53.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag				Lead			
Lead-Lag Optimize?	Yes	Yes		Yes	Yes				Yes			
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		Max	Max	None	Max	Max	
Walk Time (s)		7.0					7.0	7.0				
Flash Dont Walk (s)		20.6					27.1	27.1				
Pedestrian Calls (#/hr)		0					0	0				
Act Effct Green (s)	8.8	25.5		20.5	39.4		53.6	53.6	78.7	53.6	53.6	
Actuated g/C Ratio	0.08	0.23		0.18	0.35		0.47	0.47	0.70	0.47	0.47	
v/c Ratio	0.39	0.72		0.64	0.52		0.24	0.05	0.89	0.36	0.16	
Control Delay	58.6	43.0		49.1	30.6		20.4	17.8	26.3	22.0	7.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	58.6	43.0		49.1	30.6		20.4	17.8	26.3	22.0	7.0	
LOS	E	D		D	C		C	B	C	C	A	
Approach Delay		43.9			36.2			25.3			14.1	
Approach LOS		D			D			C			B	

Intersection Summary	
Area Type: Other	
Cycle Length: 120	
Actuated Cycle Length: 113.2	
Natural Cycle: 95	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 31.8	Intersection LOS: C
Intersection Capacity Utilization 95.9%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 13: Nutmeg St & Clinton Keith Rd



15: Murrieta Oaks Ave/Mitchell Rd & Clinton Keith Rd

Timing Plan: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	566	1896	209	176	1388	15	55	10	192	10	38	27
Future Volume (vph)	566	1896	209	176	1388	15	55	10	192	10	38	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		210	0		0	200		200
Storage Lanes	1		0	1		1	1		0	1		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Frt		0.985				0.850		0.857				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	5009	0	1770	5085	1583	1770	1596	0	1770	1863	2787
Flt Permitted	0.083			0.092			0.950			0.950		
Satd. Flow (perm)	155	5009	0	171	5085	1583	1770	1596	0	1770	1863	2787
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17				109		200				109
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1884			2845			958			1018	
Travel Time (s)		42.8			64.7			21.8			23.1	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	590	1975	218	183	1446	16	57	10	200	10	40	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	590	2193	0	183	1446	16	57	210	0	10	40	28
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8						6

15: Murrieta Oaks Ave/Mitchell Rd & Clinton Keith Rd

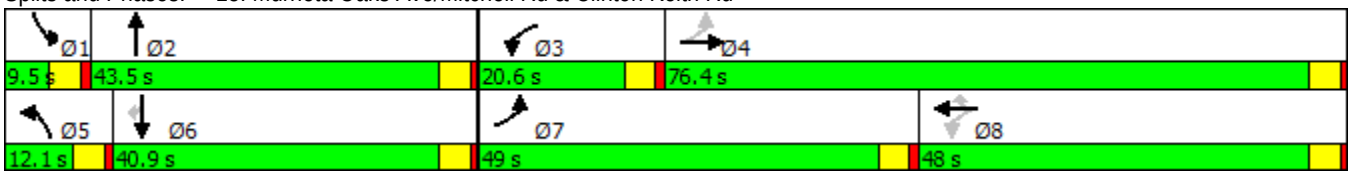
Timing Plan: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	26.1		9.5	35.5	35.5	9.5	41.5		9.5	38.4	38.4
Total Split (s)	49.0	76.4		20.6	48.0	48.0	12.1	43.5		9.5	40.9	40.9
Total Split (%)	32.7%	50.9%		13.7%	32.0%	32.0%	8.1%	29.0%		6.3%	27.3%	27.3%
Maximum Green (s)	44.5	71.9		16.1	43.5	43.5	7.6	39.0		5.0	36.4	36.4
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	Max		None	Max	Max
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		14.6			24.0	24.0		30.0			26.9	26.9
Pedestrian Calls (#/hr)		0			0	0		0			0	0
Act Effct Green (s)	92.6	73.7		57.9	43.5	43.5	7.4	42.8		5.0	37.0	37.0
Actuated g/C Ratio	0.63	0.50		0.39	0.29	0.29	0.05	0.29		0.03	0.25	0.25
v/c Ratio	1.01	0.88		0.83	0.97	0.03	0.66	0.35		0.17	0.09	0.04
Control Delay	83.2	38.6		71.1	68.3	0.1	101.7	8.1		77.0	44.8	0.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	83.2	38.6		71.1	68.3	0.1	101.7	8.1		77.0	44.8	0.1
LOS	F	D		E	E	A	F	A		E	D	A
Approach Delay		48.1			67.9			28.1			32.9	
Approach LOS		D			E			C			C	

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 148.1
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.01
Intersection Signal Delay: 53.6 Intersection LOS: D
Intersection Capacity Utilization 81.8% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 15: Murrieta Oaks Ave/Mitchell Rd & Clinton Keith Rd

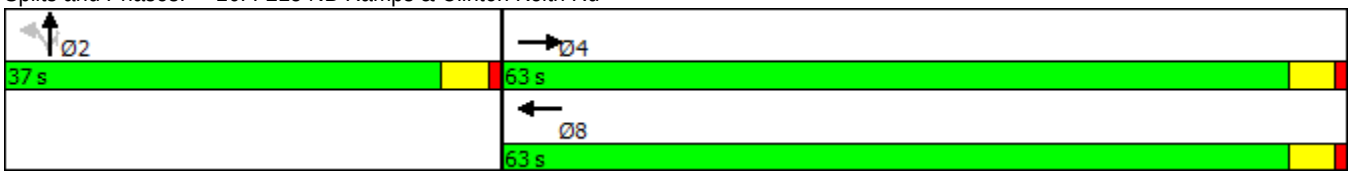


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	2426	759	0	1739	291	489	0	674	0	0	0
Future Volume (vph)	0	2426	759	0	1739	291	489	0	674	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		160	0		0	0		0	0		0
Storage Lanes	0		1	0		1	1		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.95	0.91	0.95	1.00	1.00	1.00
Frt			0.850			0.850		0.884	0.850			
Flt Protected							0.950	0.989				
Satd. Flow (prot)	0	5085	1583	0	5085	1583	1681	1482	1504	0	0	0
Flt Permitted							0.950	0.989				
Satd. Flow (perm)	0	5085	1583	0	5085	1583	1681	1482	1504	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			227			181		16	16			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2845			3447			1631			722	
Travel Time (s)		64.7			78.3			37.1			16.4	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	0	2923	914	0	2095	351	589	0	812	0	0	0
Shared Lane Traffic (%)							18%		44%			
Lane Group Flow (vph)	0	2923	914	0	2095	351	483	463	455	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2	1		2	1	1	2	1			
Detector Template		Thru	Right		Thru	Right	Left	Thru	Right			
Leading Detector (ft)		100	20		100	20	20	100	20			
Trailing Detector (ft)		0	0		0	0	0	0	0			
Detector 1 Position(ft)		0	0		0	0	0	0	0			
Detector 1 Size(ft)		6	20		6	20	20	6	20			
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0			
Detector 1 Queue (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0			
Detector 1 Delay (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0			
Detector 2 Position(ft)		94			94			94				
Detector 2 Size(ft)		6			6			6				
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				
Turn Type		NA	Free		NA	Free	Perm	NA	Perm			
Protected Phases		4			8			2				
Permitted Phases			Free			Free	2		2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		4			8		2	2	2			
Switch Phase												
Minimum Initial (s)		5.0			5.0		5.0	5.0	5.0			
Minimum Split (s)		43.5			9.5		9.5	9.5	9.5			
Total Split (s)		63.0			63.0		37.0	37.0	37.0			
Total Split (%)		63.0%			63.0%		37.0%	37.0%	37.0%			
Maximum Green (s)		58.5			58.5		32.5	32.5	32.5			
Yellow Time (s)		3.5			3.5		3.5	3.5	3.5			
All-Red Time (s)		1.0			1.0		1.0	1.0	1.0			
Lost Time Adjust (s)		0.0			0.0		0.0	0.0	0.0			
Total Lost Time (s)		4.5			4.5		4.5	4.5	4.5			
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0			
Recall Mode		None			None		Max	Max	Max			
Walk Time (s)		7.0										
Flash Dont Walk (s)		32.0										
Pedestrian Calls (#/hr)		0										
Act Effct Green (s)		58.5	100.0		58.5	100.0	32.5	32.5	32.5			
Actuated g/C Ratio		0.58	1.00		0.58	1.00	0.32	0.32	0.32			
v/c Ratio		0.98	0.58		0.70	0.22	0.88	0.94	0.91			
Control Delay		33.9	1.5		16.3	0.3	51.8	61.5	56.1			
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0			
Total Delay		33.9	1.5		16.3	0.3	51.8	61.5	56.1			
LOS		C	A		B	A	D	E	E			
Approach Delay		26.2			14.0			56.4				
Approach LOS		C			B			E				

Intersection Summary	
Area Type: Other	
Cycle Length: 100	
Actuated Cycle Length: 100	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.98	
Intersection Signal Delay: 27.8	Intersection LOS: C
Intersection Capacity Utilization 82.2%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 16: I-215 NB Ramps & Clinton Keith Rd

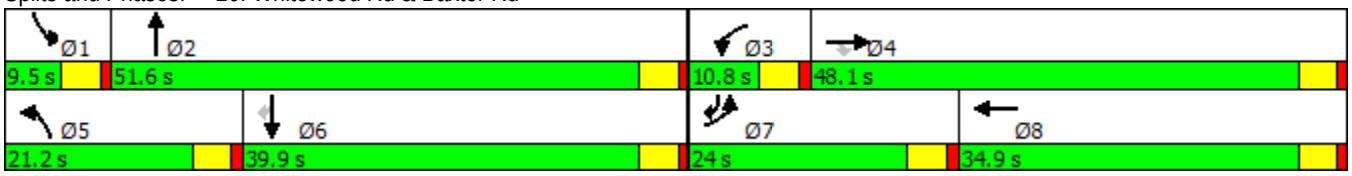


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	160	10	157	28	15	10	176	330	16	10	786	652
Future Volume (vph)	160	10	157	28	15	10	176	330	16	10	786	652
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	215		0	120		0	220		0	200		0
Storage Lanes	1		1	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850		0.939			0.993				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	3323	0	1770	3514	0	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1863	1583	1770	3323	0	1770	3514	0	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			171		11			5				709
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2823			874			2884			792	
Travel Time (s)		64.2			19.9			65.5			18.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	174	11	171	30	16	11	191	359	17	11	854	709
Shared Lane Traffic (%)												
Lane Group Flow (vph)	174	11	171	30	27	0	191	376	0	11	854	709
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	7	4		3	8		5	2		1	6	7
Permitted Phases			4									6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8		5	2		1	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	35.5	35.5	9.5	34.9		9.5	32.1		9.5	32.1	9.5
Total Split (s)	24.0	48.1	48.1	10.8	34.9		21.2	51.6		9.5	39.9	24.0
Total Split (%)	20.0%	40.1%	40.1%	9.0%	29.1%		17.7%	43.0%		7.9%	33.3%	20.0%
Maximum Green (s)	19.5	43.6	43.6	6.3	30.4		16.7	47.1		5.0	35.4	19.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	Max		None	Max	None
Walk Time (s)		7.0	7.0		7.0			7.0			7.0	
Flash Dont Walk (s)		24.0	24.0		23.4			20.6			20.6	
Pedestrian Calls (#/hr)		0	0		0			0			0	
Act Effct Green (s)	14.2	14.3	14.3	6.2	6.1		13.9	53.0		5.1	36.1	54.9
Actuated g/C Ratio	0.17	0.17	0.17	0.08	0.07		0.17	0.65		0.06	0.44	0.67
v/c Ratio	0.57	0.03	0.41	0.22	0.11		0.63	0.16		0.10	0.55	0.55
Control Delay	40.1	30.4	8.6	44.5	30.2		43.7	8.0		44.1	20.7	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	40.1	30.4	8.6	44.5	30.2		43.7	8.0		44.1	20.7	2.4
LOS	D	C	A	D	C		D	A		D	C	A
Approach Delay		24.7			37.7			20.0			12.6	
Approach LOS		C			D			C			B	

Intersection Summary	
Area Type: Other	
Cycle Length: 120	
Actuated Cycle Length: 81.8	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.63	
Intersection Signal Delay: 16.5	Intersection LOS: B
Intersection Capacity Utilization 65.5%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 20: Whitewood Rd & Baxter Rd



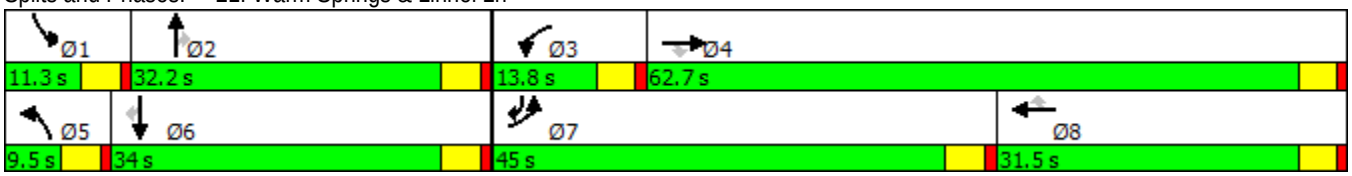
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	573	197	17	55	87	63	10	209	36	85	495	238
Future Volume (vph)	573	197	17	55	87	63	10	209	36	85	495	238
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			95			136			136			238
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		450			400			650			700	
Travel Time (s)		10.2			9.1			14.8			15.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	573	197	17	55	87	63	10	209	36	85	495	238
Shared Lane Traffic (%)												
Lane Group Flow (vph)	573	197	17	55	87	63	10	209	36	85	495	238
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	7	4		3	8		5	2		1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	9.5	31.5	31.5	9.5	31.5	31.5	9.5	31.5	31.5	9.5	31.5	9.5
Total Split (s)	45.0	62.7	62.7	13.8	31.5	31.5	9.5	32.2	32.2	11.3	34.0	45.0
Total Split (%)	37.5%	52.3%	52.3%	11.5%	26.3%	26.3%	7.9%	26.8%	26.8%	9.4%	28.3%	37.5%
Maximum Green (s)	40.5	58.2	58.2	9.3	27.0	27.0	5.0	27.7	27.7	6.8	29.5	40.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		20.0	20.0		20.0	20.0		20.0	20.0		20.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	
Act Effct Green (s)	34.1	33.9	33.9	7.8	7.6	7.6	5.2	11.8	11.8	7.1	22.1	62.2
Actuated g/C Ratio	0.45	0.44	0.44	0.10	0.10	0.10	0.07	0.15	0.15	0.09	0.29	0.81
v/c Ratio	0.72	0.13	0.02	0.30	0.25	0.23	0.08	0.38	0.10	0.52	0.48	0.18
Control Delay	25.5	14.4	0.1	41.1	37.8	1.9	42.0	32.7	0.6	51.2	26.8	0.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.5	14.4	0.1	41.1	37.8	1.9	42.0	32.7	0.6	51.2	26.8	0.8
LOS	C	B	A	D	D	A	D	C	A	D	C	A
Approach Delay		22.2			27.6			28.5			21.8	
Approach LOS		C			C			C			C	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 76.4
Natural Cycle: 115
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.72
Intersection Signal Delay: 23.4 Intersection LOS: C
Intersection Capacity Utilization 68.8% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 21: Warm Springs & Linnel Ln



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	265	924	132	231	10	800	877	124	10	1635	10
Future Volume (vph)	10	265	924	132	231	10	800	877	124	10	1635	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		150	0		0	0		0	0		0
Storage Lanes	2		2	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.88	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	2787	3433	3539	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3539	2787	3433	3539	1583	3433	5085	1583	3433	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			47			117			124			117
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		4370			1699			998			766	
Travel Time (s)		99.3			38.6			22.7			17.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	10	265	924	132	231	10	800	877	124	10	1635	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	10	265	924	132	231	10	800	877	124	10	1635	10
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			8			2			6

23: Winchester Rd & Clinton Keith Rd/Benton Rd

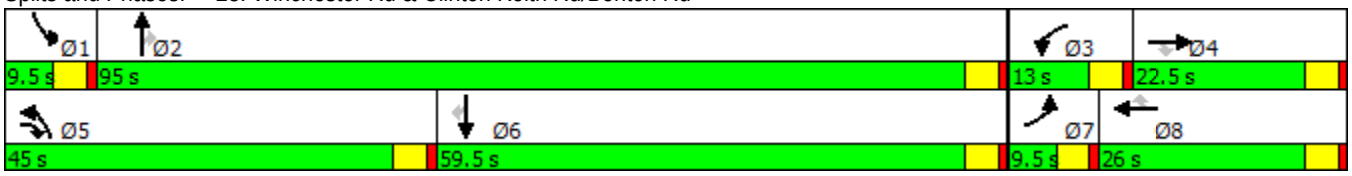
Timing Plan: AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	5	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	9.5	22.5	45.0	13.0	26.0	26.0	45.0	95.0	95.0	9.5	59.5	59.5
Total Split (%)	6.8%	16.1%	32.1%	9.3%	18.6%	18.6%	32.1%	67.9%	67.9%	6.8%	42.5%	42.5%
Maximum Green (s)	5.0	18.0	40.5	8.5	21.5	21.5	40.5	90.5	90.5	5.0	55.0	55.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0			11.0	11.0		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0			0	0		0	0		0	0
Act Effct Green (s)	5.0	14.9	56.6	8.3	25.9	25.9	37.1	95.3	95.3	5.0	55.5	55.5
Actuated g/C Ratio	0.04	0.11	0.42	0.06	0.19	0.19	0.28	0.71	0.71	0.04	0.41	0.41
v/c Ratio	0.08	0.67	0.77	0.62	0.34	0.03	0.84	0.24	0.11	0.08	0.78	0.01
Control Delay	66.3	66.5	35.9	75.9	49.3	0.1	54.8	7.4	1.5	66.3	37.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.3	66.5	35.9	75.9	49.3	0.1	54.8	7.4	1.5	66.3	37.8	0.0
LOS	E	E	D	E	D	A	D	A	A	E	D	A
Approach Delay		42.9			57.4			28.0			37.8	
Approach LOS		D			E			C			D	

Intersection Summary

Area Type: Other
Cycle Length: 140
Actuated Cycle Length: 133.9
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 37.0 Intersection LOS: D
Intersection Capacity Utilization 80.9% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 23: Winchester Rd & Clinton Keith Rd/Benton Rd



1: Jefferson Ave & Murrieta Hot Springs Rd

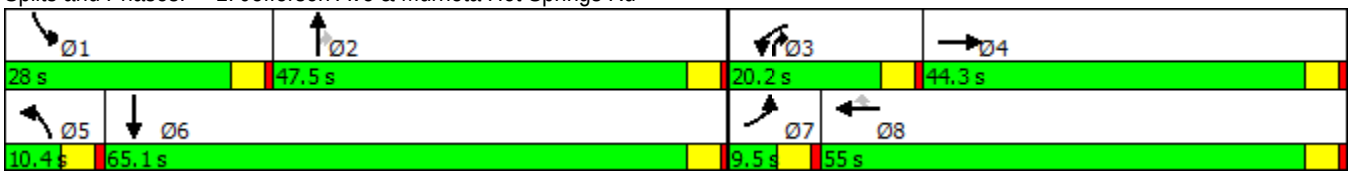
Timing Plan: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	131	23	376	98	835	19	1546	1067	672	940	14
Future Volume (vph)	10	131	23	376	98	835	19	1546	1067	672	940	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		265	0		280	185		0
Storage Lanes	1		0	2		1	1		2	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	0.97	0.91	1.00	1.00	0.91	0.88	0.97	0.91	0.91
Frt		0.978				0.850			0.850		0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	4973	0	3433	5085	1583	1770	5085	2787	3433	5075	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	4973	0	3433	5085	1583	1770	5085	2787	3433	5075	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25				365			686		2	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		687			1412			1630			2768	
Travel Time (s)		15.6			32.1			37.0			62.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	142	25	409	107	908	21	1680	1160	730	1022	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	167	0	409	107	908	21	1680	1160	730	1037	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		48			48			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases						8			2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	3	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	43.5		9.5	44.4	44.4	9.5	33.8	9.5	9.5	22.5	
Total Split (s)	9.5	44.3		20.2	55.0	55.0	10.4	47.5	20.2	28.0	65.1	
Total Split (%)	6.8%	31.6%		14.4%	39.3%	39.3%	7.4%	33.9%	14.4%	20.0%	46.5%	
Maximum Green (s)	5.0	39.8		15.7	50.5	50.5	5.9	43.0	15.7	23.5	60.6	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max	None	None	Max	
Walk Time (s)		7.0			7.0	7.0		7.0				
Flash Dont Walk (s)		32.0			32.9	32.9		22.3				
Pedestrian Calls (#/hr)		0			0	0		0				
Act Effct Green (s)	5.0	34.0		15.7	50.6	50.6	5.8	43.1	63.3	23.5	65.0	
Actuated g/C Ratio	0.04	0.25		0.12	0.38	0.38	0.04	0.32	0.47	0.17	0.48	
v/c Ratio	0.17	0.13		1.02	0.06	1.10	0.28	1.03	0.69	1.21	0.42	
Control Delay	70.5	32.7		107.6	27.6	87.7	73.1	75.2	13.0	157.3	24.3	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	70.5	32.7		107.6	27.6	87.7	73.1	75.2	13.0	157.3	24.3	
LOS	E	C		F	C	F	E	E	B	F	C	
Approach Delay		35.0			88.9			50.0			79.2	
Approach LOS		D			F			D			E	

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 134.3	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.21	
Intersection Signal Delay: 66.7	Intersection LOS: E
Intersection Capacity Utilization 97.0%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 1: Jefferson Ave & Murrieta Hot Springs Rd

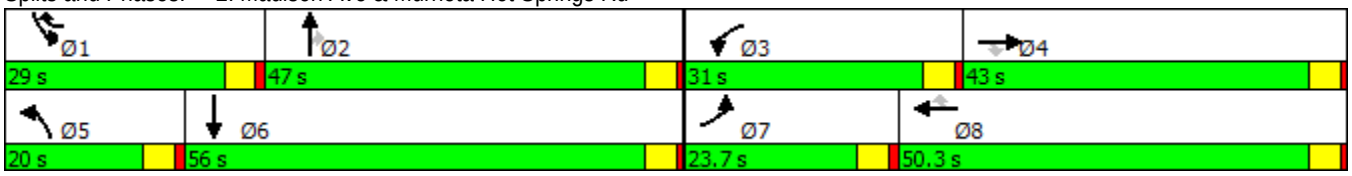


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	320	1637	83	657	1237	549	194	787	660	614	460	124
Future Volume (vph)	320	1637	83	657	1237	549	194	787	660	614	460	124
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	250		0	100		100	165		0
Storage Lanes	2		1	2		1	2		2	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.86	1.00	0.97	0.91	1.00	0.97	0.95	0.88	0.97	0.95	0.95
Frt			0.850			0.850			0.850		0.968	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	6408	1583	3433	5085	1583	3433	3539	2787	3433	3426	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	6408	1583	3433	5085	1583	3433	3539	2787	3433	3426	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			142			44			267		25	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1412			2198			1707			1381	
Travel Time (s)		32.1			50.0			38.8			31.4	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	360	1839	93	738	1390	617	218	884	742	690	517	139
Shared Lane Traffic (%)												
Lane Group Flow (vph)	360	1839	93	738	1390	617	218	884	742	690	656	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8	1	5	2		1	6	
Permitted Phases			4			8			2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	1	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	35.5	35.5	9.5	38.4	9.5	9.5	45.2	45.2	9.5	45.2	
Total Split (s)	23.7	43.0	43.0	31.0	50.3	29.0	20.0	47.0	47.0	29.0	56.0	
Total Split (%)	15.8%	28.7%	28.7%	20.7%	33.5%	19.3%	13.3%	31.3%	31.3%	19.3%	37.3%	
Maximum Green (s)	19.2	38.5	38.5	26.5	45.8	24.5	15.5	42.5	42.5	24.5	51.5	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0	7.0		7.0			7.0	7.0		7.0	
Flash Dont Walk (s)		24.0	24.0		26.9			33.7	33.7		33.7	
Pedestrian Calls (#/hr)		0	0		0			0	0		0	
Act Effct Green (s)	18.6	38.5	38.5	26.5	46.4	75.4	14.0	42.5	42.5	24.5	53.0	
Actuated g/C Ratio	0.12	0.26	0.26	0.18	0.31	0.50	0.09	0.28	0.28	0.16	0.35	
v/c Ratio	0.85	1.12	0.18	1.22	0.88	0.76	0.68	0.88	0.76	1.23	0.53	
Control Delay	82.6	112.3	1.9	162.8	57.1	35.0	77.0	62.7	36.3	169.8	39.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	82.6	112.3	1.9	162.8	57.1	35.0	77.0	62.7	36.3	169.8	39.3	
LOS	F	F	A	F	E	C	E	E	D	F	D	
Approach Delay		103.2			80.6			53.8			106.2	
Approach LOS		F			F			D			F	

Intersection Summary	
Area Type:	Other
Cycle Length: 150	
Actuated Cycle Length: 150	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.23	
Intersection Signal Delay: 85.0	Intersection LOS: F
Intersection Capacity Utilization 96.7%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 2: Madison Ave & Murrieta Hot Springs Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	203	67	49	10	143	484	77	2901	10	225	2121	115
Future Volume (vph)	203	67	49	10	143	484	77	2901	10	225	2121	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	0.91	0.91	0.97	0.91	0.91
Frt		0.937				0.850		0.999			0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	4765	0	1770	5085	1583	1770	5080	0	3433	5045	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	4765	0	1770	5085	1583	1770	5080	0	3433	5045	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		53				76					8	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1266			804			669			738	
Travel Time (s)		28.8			18.3			15.2			16.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	221	73	53	11	155	526	84	3153	11	245	2305	125
Shared Lane Traffic (%)												
Lane Group Flow (vph)	221	126	0	11	155	526	84	3164	0	245	2430	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8	1	5	2		1	6	
Permitted Phases						8						
Detector Phase	7	4		3	8	1	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	9.5	50.9		9.5	9.5	9.5	9.5	41.9		9.5	49.8	
Total Split (s)	34.0	50.9		9.5	26.4	13.0	12.4	76.6		13.0	77.2	
Total Split (%)	22.7%	33.9%		6.3%	17.6%	8.7%	8.3%	51.1%		8.7%	51.5%	
Maximum Green (s)	29.5	46.4		5.0	21.9	8.5	7.9	72.1		8.5	72.7	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max		None	Max	
Walk Time (s)		7.0						7.0			7.0	
Flash Dont Walk (s)		39.4						30.4			38.3	
Pedestrian Calls (#/hr)		0						0			0	
Act Effct Green (s)	21.2	31.5		5.0	9.3	22.4	7.9	72.3		8.5	72.9	
Actuated g/C Ratio	0.16	0.24		0.04	0.07	0.17	0.06	0.56		0.07	0.56	
v/c Ratio	0.76	0.11		0.16	0.42	1.57	0.78	1.12		1.09	0.85	
Control Delay	69.0	22.7		68.8	62.0	298.8	102.8	86.0		140.6	28.5	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	69.0	22.7		68.8	62.0	298.8	102.8	86.0		140.6	28.5	
LOS	E	C		E	E	F	F	F		F	C	
Approach Delay		52.2			242.1			86.5			38.8	
Approach LOS		D			F			F			D	

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 129.5
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.57
Intersection Signal Delay: 81.9 Intersection LOS: F
Intersection Capacity Utilization 108.7% ICU Level of Service G
Analysis Period (min) 15

Splits and Phases: 4: Hwy 79 & Scott Rd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	339	496	403	375	219	115	227	337	385	190	269	171
Future Volume (vph)	339	496	403	375	219	115	227	337	385	190	269	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		20	150		0
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850		0.948				0.850		0.942	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3355	0	1770	3539	1583	1770	3334	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3539	1583	1770	3355	0	1770	3539	1583	1770	3334	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			205		55				130		87	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		620			2823			806			5440	
Travel Time (s)		14.1			64.2			18.3			123.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	339	496	403	375	219	115	227	337	385	190	269	171
Shared Lane Traffic (%)												
Lane Group Flow (vph)	339	496	403	375	334	0	227	337	385	190	440	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4						2			

6: Antelope Rd/Warm Springs Rd & Baxter Rd

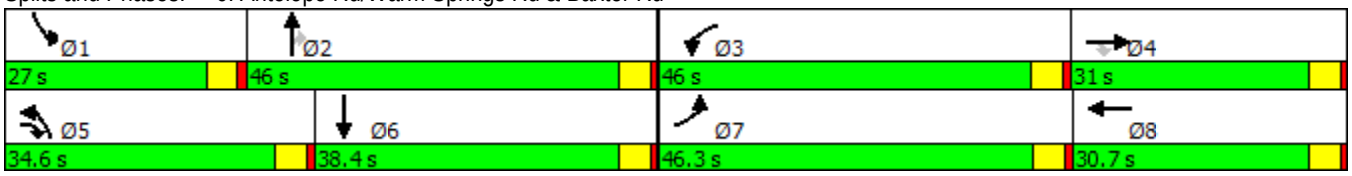
Timing Plan: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	5	3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	28.5	9.5	9.5	28.5		9.5	34.9	34.9	9.5	28.5	
Total Split (s)	46.3	31.0	34.6	46.0	30.7		34.6	46.0	46.0	27.0	38.4	
Total Split (%)	30.9%	20.7%	23.1%	30.7%	20.5%		23.1%	30.7%	30.7%	18.0%	25.6%	
Maximum Green (s)	41.8	26.5	30.1	41.5	26.2		30.1	41.5	41.5	22.5	33.9	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None		None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0			7.0	7.0		7.0	
Flash Dont Walk (s)		17.0			17.0			17.0	17.0		17.0	
Pedestrian Calls (#/hr)		0			0			0	0		0	
Act Effct Green (s)	31.1	23.3	50.4	33.2	25.3		22.5	42.1	42.1	18.7	38.3	
Actuated g/C Ratio	0.23	0.17	0.37	0.25	0.19		0.17	0.31	0.31	0.14	0.28	
v/c Ratio	0.83	0.82	0.56	0.87	0.50		0.77	0.31	0.66	0.78	0.44	
Control Delay	68.5	66.9	18.9	70.2	45.0		72.9	39.1	34.9	79.6	35.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	68.5	66.9	18.9	70.2	45.0		72.9	39.1	34.9	79.6	35.9	
LOS	E	E	B	E	D		E	D	C	E	D	
Approach Delay		51.7			58.3			45.5			49.0	
Approach LOS		D			E			D			D	

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 135.5
Natural Cycle: 105
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.87
Intersection Signal Delay: 50.9 Intersection LOS: D
Intersection Capacity Utilization 75.0% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 6: Antelope Rd/Warm Springs Rd & Baxter Rd



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1364	318	807	1619	217	765
Future Volume (vph)	1364	318	807	1619	217	765
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	225		100	0
Storage Lanes		0	2		1	2
Taper Length (ft)			25		25	
Lane Util. Factor	0.91	0.91	0.97	0.91	1.00	0.88
Frt	0.972					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	4943	0	3433	5085	1770	2787
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	4943	0	3433	5085	1770	2787
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	44					805
Link Speed (mph)	30			30	30	
Link Distance (ft)	2233			3569	625	
Travel Time (s)	50.8			81.1	14.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1436	335	849	1704	228	805
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1771	0	849	1704	228	805
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	24			24	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Number of Detectors	2		1	2	1	1
Detector Template	Thru		Left	Thru	Left	Right
Leading Detector (ft)	100		20	100	20	20
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	6		20	6	20	20
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Prot	NA	Perm	Perm
Protected Phases	4		3	8		
Permitted Phases					2	2

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	4		3	8	2	2
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0
Minimum Split (s)	36.6		9.5	9.5	37.2	37.2
Total Split (s)	57.4		44.6	102.0	38.0	38.0
Total Split (%)	41.0%		31.9%	72.9%	27.1%	27.1%
Maximum Green (s)	52.9		40.1	97.5	33.5	33.5
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5		4.5	4.5	4.5	4.5
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		None	None	Max	Max
Walk Time (s)	7.0				7.0	7.0
Flash Dont Walk (s)	25.1				25.7	25.7
Pedestrian Calls (#/hr)	0				0	0
Act Effct Green (s)	52.9		37.4	94.9	33.5	33.5
Actuated g/C Ratio	0.39		0.27	0.69	0.24	0.24
v/c Ratio	0.92		0.91	0.49	0.53	0.62
Control Delay	48.0		62.5	10.4	50.9	5.1
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	48.0		62.5	10.4	50.9	5.1
LOS	D		E	B	D	A
Approach Delay	48.0			27.7	15.2	
Approach LOS	D			C	B	

Intersection Summary	
Area Type: Other	
Cycle Length: 140	
Actuated Cycle Length: 137.4	
Natural Cycle: 115	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.92	
Intersection Signal Delay: 32.0	Intersection LOS: C
Intersection Capacity Utilization 79.7%	ICU Level of Service D
Analysis Period (min) 15	

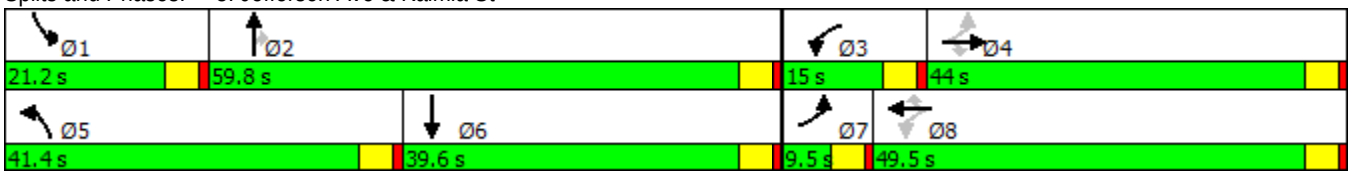
Splits and Phases: 7: California Oaks Rd & Clinton Keith Rd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	561	340	185	489	561	724	1194	506	295	855	22
Future Volume (vph)	14	561	340	185	489	561	724	1194	506	295	855	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	175		140	235		0	205		0	145		0
Storage Lanes	1		1	1		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.95	1.00	0.97	0.91	1.00	0.97	0.91	0.91
Frt			0.850			0.850			0.850		0.996	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	5085	1583	1770	3539	1583	3433	5085	1583	3433	5065	0
Flt Permitted	0.398			0.241			0.950			0.950		
Satd. Flow (perm)	741	5085	1583	449	3539	1583	3433	5085	1583	3433	5065	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			374			326			150		3	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1399			684			2782			1004	
Travel Time (s)		31.8			15.5			63.2			22.8	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	15	616	374	203	537	616	796	1312	556	324	940	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	15	616	374	203	537	616	796	1312	556	324	964	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8			2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	44.0	44.0	9.5	34.9	34.9	9.5	38.6	38.6	9.5	39.5	
Total Split (s)	9.5	44.0	44.0	15.0	49.5	49.5	41.4	59.8	59.8	21.2	39.6	
Total Split (%)	6.8%	31.4%	31.4%	10.7%	35.4%	35.4%	29.6%	42.7%	42.7%	15.1%	28.3%	
Maximum Green (s)	5.0	39.5	39.5	10.5	45.0	45.0	36.9	55.3	55.3	16.7	35.1	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		32.5	32.5		23.4	23.4		27.1	27.1		28.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	
Act Effct Green (s)	32.8	27.8	27.8	42.9	39.4	39.4	33.1	55.7	55.7	15.5	38.1	
Actuated g/C Ratio	0.26	0.22	0.22	0.34	0.31	0.31	0.26	0.44	0.44	0.12	0.30	
v/c Ratio	0.07	0.56	0.59	0.78	0.49	0.86	0.90	0.59	0.72	0.78	0.64	
Control Delay	28.2	45.9	7.7	54.0	38.1	32.8	59.7	30.1	29.0	68.9	43.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	28.2	45.9	7.7	54.0	38.1	32.8	59.7	30.1	29.0	68.9	43.0	
LOS	C	D	A	D	D	C	E	C	C	E	D	
Approach Delay		31.4			38.1			38.7			49.5	
Approach LOS		C			D			D			D	

Intersection Summary	
Area Type: Other	
Cycle Length: 140	
Actuated Cycle Length: 127.7	
Natural Cycle: 125	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 39.6	Intersection LOS: D
Intersection Capacity Utilization 73.8%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 8: Jefferson Ave & Kalmia St



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	176	2070	89	113	2008	442	75	388	216	467	198	121
Future Volume (vph)	176	2070	89	113	2008	442	75	388	216	467	198	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	215		0	150		0	150		0	225		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.994				0.850			0.850		0.943	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	5055	0	1770	5085	1583	1770	3539	1583	1770	3337	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	5055	0	1770	5085	1583	1770	3539	1583	1770	3337	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				242			121		97	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		764			996			580			564	
Travel Time (s)		17.4			22.6			13.2			12.8	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	187	2202	95	120	2136	470	80	413	230	497	211	129
Shared Lane Traffic (%)												
Lane Group Flow (vph)	187	2297	0	120	2136	470	80	413	230	497	340	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			

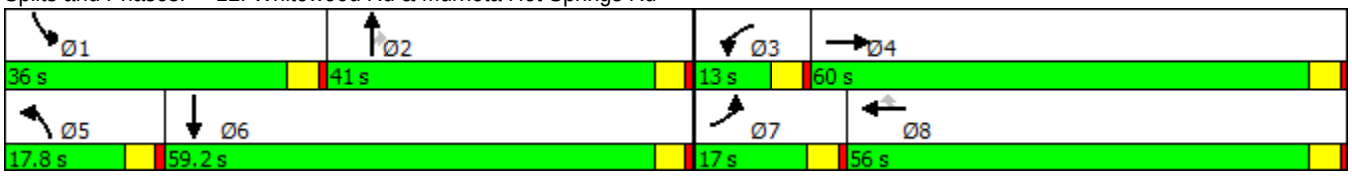
12: Whitewood Rd & Murrieta Hot Springs Rd

Timing Plan: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	26.6		9.5	32.6	32.6	9.5	38.6	38.6	9.5	38.9	
Total Split (s)	17.0	60.0		13.0	56.0	56.0	17.8	41.0	41.0	36.0	59.2	
Total Split (%)	11.3%	40.0%		8.7%	37.3%	37.3%	11.9%	27.3%	27.3%	24.0%	39.5%	
Maximum Green (s)	12.5	55.5		8.5	51.5	51.5	13.3	36.5	36.5	31.5	54.7	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		15.1			21.1	21.1		27.1	27.1		27.4	
Pedestrian Calls (#/hr)		0			0	0		0	0		0	
Act Effct Green (s)	12.5	55.5		8.5	51.5	51.5	11.3	36.5	36.5	31.5	56.7	
Actuated g/C Ratio	0.08	0.37		0.06	0.34	0.34	0.08	0.24	0.24	0.21	0.38	
v/c Ratio	1.27	1.23		1.20	1.22	0.67	0.61	0.48	0.48	1.34	0.26	
Control Delay	217.0	147.2		209.8	148.0	24.7	85.8	50.8	26.1	214.3	23.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	217.0	147.2		209.8	148.0	24.7	85.8	50.8	26.1	214.3	23.4	
LOS	F	F		F	F	C	F	D	C	F	C	
Approach Delay		152.4			129.5			46.8			136.8	
Approach LOS		F			F			D			F	

Intersection Summary	
Area Type:	Other
Cycle Length: 150	
Actuated Cycle Length: 150	
Natural Cycle: 145	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.34	
Intersection Signal Delay: 130.0	Intersection LOS: F
Intersection Capacity Utilization 100.1%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 12: Whitewood Rd & Murrieta Hot Springs Rd

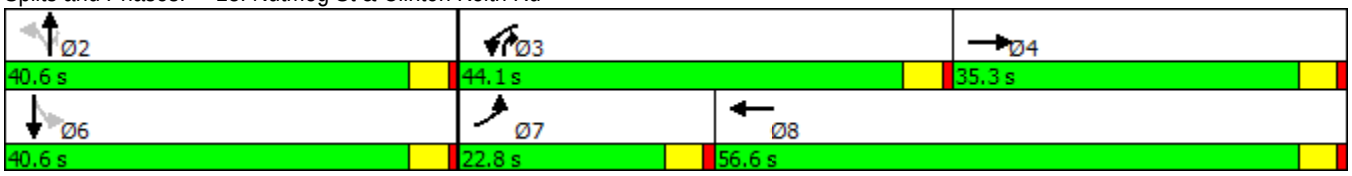


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	139	842	82	796	820	126	139	195	640	128	49	140
Future Volume (vph)	139	842	82	796	820	126	139	195	640	128	49	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	225		0	180		0	50		0
Storage Lanes	1		0	2		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	0.97	0.91	0.91	1.00	1.00	1.00	1.00	0.95	0.95
Frt		0.987			0.980				0.850		0.889	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	5019	0	3433	4984	0	1770	1863	1583	1770	3146	0
Flt Permitted	0.950			0.950			0.622			0.536		
Satd. Flow (perm)	1770	5019	0	3433	4984	0	1159	1863	1583	998	3146	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			30				14		149	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		471			2233			1168			1110	
Travel Time (s)		10.7			50.8			26.5			25.2	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	148	896	87	847	872	134	148	207	681	136	52	149
Shared Lane Traffic (%)												
Lane Group Flow (vph)	148	983	0	847	1006	0	148	207	681	136	201	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	7	4		3	8			2	3		6	
Permitted Phases							2		2	6		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		2	2	3	6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	32.1		9.5	9.5		38.6	38.6	9.5	9.5	9.5	
Total Split (s)	22.8	35.3		44.1	56.6		40.6	40.6	44.1	40.6	40.6	
Total Split (%)	19.0%	29.4%		36.8%	47.2%		33.8%	33.8%	36.8%	33.8%	33.8%	
Maximum Green (s)	18.3	30.8		39.6	52.1		36.1	36.1	39.6	36.1	36.1	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag				Lead			
Lead-Lag Optimize?	Yes	Yes		Yes	Yes				Yes			
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		Max	Max	None	Max	Max	
Walk Time (s)		7.0					7.0	7.0				
Flash Dont Walk (s)		20.6					27.1	27.1				
Pedestrian Calls (#/hr)		0					0	0				
Act Effct Green (s)	14.2	27.9		34.1	47.8		36.4	36.4	75.0	36.4	36.4	
Actuated g/C Ratio	0.13	0.25		0.30	0.43		0.32	0.32	0.67	0.32	0.32	
v/c Ratio	0.66	0.78		0.81	0.47		0.39	0.34	0.64	0.42	0.18	
Control Delay	62.2	44.0		43.0	23.1		35.5	32.7	14.2	37.0	9.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	62.2	44.0		43.0	23.1		35.5	32.7	14.2	37.0	9.6	
LOS	E	D		D	C		D	C	B	D	A	
Approach Delay		46.4			32.2			20.9			20.7	
Approach LOS		D			C			C			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 112	
Natural Cycle: 95	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.81	
Intersection Signal Delay: 32.3	Intersection LOS: C
Intersection Capacity Utilization 76.1%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 13: Nutmeg St & Clinton Keith Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	398	1870	27	137	1957	10	33	10	115	10	10	617
Future Volume (vph)	398	1870	27	137	1957	10	33	10	115	10	10	617
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		210	0		0	200		200
Storage Lanes	1		0	1		1	1		0	1		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.88
Frt		0.998				0.850		0.862				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	5075	0	1770	5085	1583	1770	1606	0	1770	1863	2787
Flt Permitted	0.063			0.068			0.950			0.950		
Satd. Flow (perm)	117	5075	0	127	5085	1583	1770	1606	0	1770	1863	2787
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				109		120				587
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1884			2845			958			1018	
Travel Time (s)		42.8			64.7			21.8			23.1	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	415	1948	28	143	2039	10	34	10	120	10	10	643
Shared Lane Traffic (%)												
Lane Group Flow (vph)	415	1976	0	143	2039	10	34	130	0	10	10	643
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8						6

15: Murrieta Oaks Ave/Mitchell Rd & Clinton Keith Rd

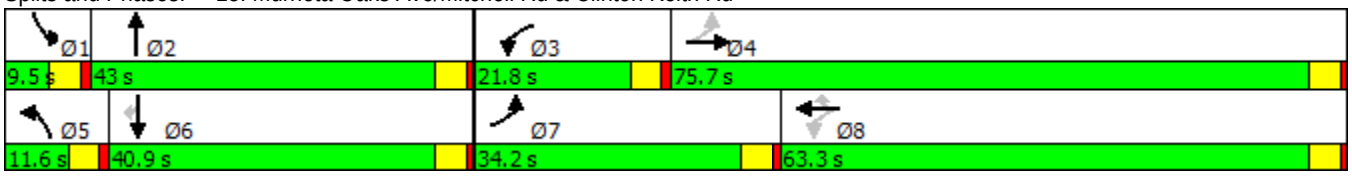
Timing Plan: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	26.1		9.5	35.5	35.5	9.5	41.5		9.5	38.4	38.4
Total Split (s)	34.2	75.7		21.8	63.3	63.3	11.6	43.0		9.5	40.9	40.9
Total Split (%)	22.8%	50.5%		14.5%	42.2%	42.2%	7.7%	28.7%		6.3%	27.3%	27.3%
Maximum Green (s)	29.7	71.2		17.3	58.8	58.8	7.1	38.5		5.0	36.4	36.4
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	Max		None	Max	Max
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		14.6			24.0	24.0		30.0			26.9	26.9
Pedestrian Calls (#/hr)		0			0	0		0			0	0
Act Effct Green (s)	93.1	75.8		71.6	58.8	58.8	6.7	42.3		5.0	36.9	36.9
Actuated g/C Ratio	0.63	0.51		0.48	0.40	0.40	0.05	0.29		0.03	0.25	0.25
v/c Ratio	1.02	0.76		0.71	1.01	0.01	0.42	0.24		0.17	0.02	0.57
Control Delay	96.7	32.2		54.0	66.4	0.0	85.8	9.7		77.0	43.6	7.7
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	96.7	32.2		54.0	66.4	0.0	85.8	9.7		77.0	43.6	7.7
LOS	F	C		D	E	A	F	A		E	D	A
Approach Delay		43.4			65.3			25.5			9.3	
Approach LOS		D			E			C			A	

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 148.1
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.02
Intersection Signal Delay: 47.6 Intersection LOS: D
Intersection Capacity Utilization 79.6% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 15: Murrieta Oaks Ave/Mitchell Rd & Clinton Keith Rd

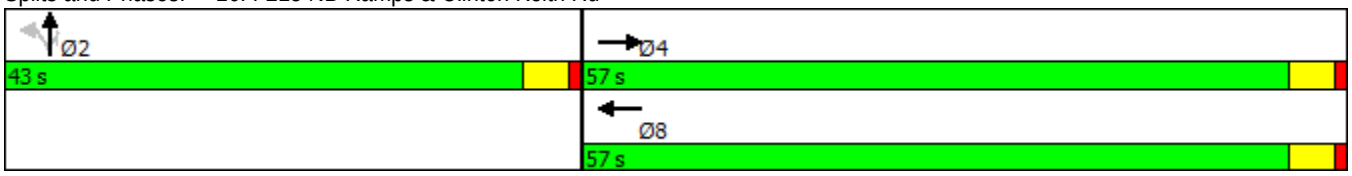


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1656	533	0	2027	93	576	0	599	0	0	0
Future Volume (vph)	0	1656	533	0	2027	93	576	0	599	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		160	0		0	0		0	0		0
Storage Lanes	0		1	0		1	1		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.95	0.91	0.95	1.00	1.00	1.00
Frt			0.850			0.850		0.913	0.850			
Flt Protected							0.950	0.979				
Satd. Flow (prot)	0	5085	1583	0	5085	1583	1681	1515	1504	0	0	0
Flt Permitted							0.950	0.979				
Satd. Flow (perm)	0	5085	1583	0	5085	1583	1681	1515	1504	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			234			65		16	16			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2845			3447			1631			722	
Travel Time (s)		64.7			78.3			37.1			16.4	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	0	1995	642	0	2442	112	694	0	722	0	0	0
Shared Lane Traffic (%)							29%		38%			
Lane Group Flow (vph)	0	1995	642	0	2442	112	493	475	448	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		2	1		2	1	1	2	1			
Detector Template		Thru	Right		Thru	Right	Left	Thru	Right			
Leading Detector (ft)		100	20		100	20	20	100	20			
Trailing Detector (ft)		0	0		0	0	0	0	0			
Detector 1 Position(ft)		0	0		0	0	0	0	0			
Detector 1 Size(ft)		6	20		6	20	20	6	20			
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0			
Detector 1 Queue (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0			
Detector 1 Delay (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0			
Detector 2 Position(ft)		94			94			94				
Detector 2 Size(ft)		6			6			6				
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				
Turn Type		NA	Free		NA	Free	Perm	NA	Perm			
Protected Phases		4			8			2				
Permitted Phases			Free			Free	2		2			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase		4			8		2	2	2			
Switch Phase												
Minimum Initial (s)		5.0			5.0		5.0	5.0	5.0			
Minimum Split (s)		43.5			9.5		9.5	9.5	9.5			
Total Split (s)		57.0			57.0		43.0	43.0	43.0			
Total Split (%)		57.0%			57.0%		43.0%	43.0%	43.0%			
Maximum Green (s)		52.5			52.5		38.5	38.5	38.5			
Yellow Time (s)		3.5			3.5		3.5	3.5	3.5			
All-Red Time (s)		1.0			1.0		1.0	1.0	1.0			
Lost Time Adjust (s)		0.0			0.0		0.0	0.0	0.0			
Total Lost Time (s)		4.5			4.5		4.5	4.5	4.5			
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0			
Recall Mode		None			None		Max	Max	Max			
Walk Time (s)		7.0										
Flash Dont Walk (s)		32.0										
Pedestrian Calls (#/hr)		0										
Act Effct Green (s)		52.5	100.0		52.5	100.0	38.5	38.5	38.5			
Actuated g/C Ratio		0.52	1.00		0.52	1.00	0.38	0.38	0.38			
v/c Ratio		0.75	0.41		0.91	0.07	0.76	0.80	0.76			
Control Delay		20.8	0.8		28.5	0.1	36.0	38.4	35.8			
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0			
Total Delay		20.8	0.8		28.5	0.1	36.0	38.4	35.8			
LOS		C	A		C	A	D	D	D			
Approach Delay		15.9			27.2			36.8				
Approach LOS		B			C			D				

Intersection Summary	
Area Type: Other	
Cycle Length: 100	
Actuated Cycle Length: 100	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 24.7	Intersection LOS: C
Intersection Capacity Utilization 68.7%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 16: I-215 NB Ramps & Clinton Keith Rd

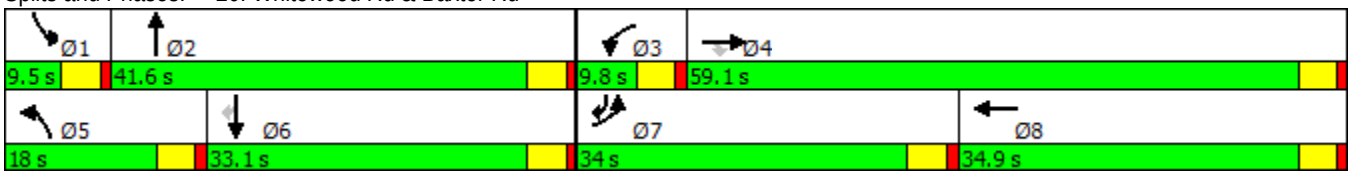


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	598	14	469	15	12	10	251	984	22	10	407	466
Future Volume (vph)	598	14	469	15	12	10	251	984	22	10	407	466
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	215		0	120		0	220		0	200		0
Storage Lanes	1		1	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850		0.931			0.997				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	3295	0	1770	3529	0	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1863	1583	1770	3295	0	1770	3529	0	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			376		11			2				507
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2823			874			2884			792	
Travel Time (s)		64.2			19.9			65.5			18.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	650	15	510	16	13	11	273	1070	24	11	442	507
Shared Lane Traffic (%)												
Lane Group Flow (vph)	650	15	510	16	24	0	273	1094	0	11	442	507
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	7	4		3	8		5	2		1	6	7
Permitted Phases			4									6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8		5	2		1	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	35.5	35.5	9.5	34.9		9.5	32.1		9.5	32.1	9.5
Total Split (s)	34.0	59.1	59.1	9.8	34.9		18.0	41.6		9.5	33.1	34.0
Total Split (%)	28.3%	49.3%	49.3%	8.2%	29.1%		15.0%	34.7%		7.9%	27.6%	28.3%
Maximum Green (s)	29.5	54.6	54.6	5.3	30.4		13.5	37.1		5.0	28.6	29.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	Max		None	Max	None
Walk Time (s)		7.0	7.0		7.0			7.0			7.0	
Flash Dont Walk (s)		24.0	24.0		23.4			20.6			20.6	
Pedestrian Calls (#/hr)		0	0		0			0			0	
Act Effct Green (s)	29.6	30.1	30.1	5.3	6.0		13.5	45.0		5.0	28.7	62.8
Actuated g/C Ratio	0.33	0.34	0.34	0.06	0.07		0.15	0.50		0.06	0.32	0.70
v/c Ratio	1.11	0.02	0.65	0.15	0.10		1.02	0.62		0.11	0.39	0.40
Control Delay	102.3	21.9	11.6	45.8	30.0		101.2	19.5		45.3	25.7	1.6
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	102.3	21.9	11.6	45.8	30.0		101.2	19.5		45.3	25.7	1.6
LOS	F	C	B	D	C		F	B		D	C	A
Approach Delay		61.9			36.3			35.9			13.2	
Approach LOS		E			D			D			B	

Intersection Summary	
Area Type: Other	
Cycle Length: 120	
Actuated Cycle Length: 89.5	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.11	
Intersection Signal Delay: 38.4	Intersection LOS: D
Intersection Capacity Utilization 83.1%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 20: Whitewood Rd & Baxter Rd



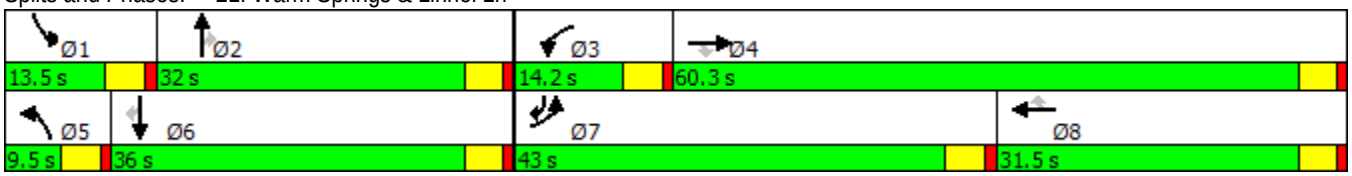
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	559	264	14	62	195	139	10	267	53	124	269	676
Future Volume (vph)	559	264	14	62	195	139	10	267	53	124	269	676
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			95			139			136			425
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		450			400			650			700	
Travel Time (s)		10.2			9.1			14.8			15.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	559	264	14	62	195	139	10	267	53	124	269	676
Shared Lane Traffic (%)												
Lane Group Flow (vph)	559	264	14	62	195	139	10	267	53	124	269	676
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	7	4		3	8		5	2		1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	9.5	31.5	31.5	9.5	31.5	31.5	9.5	31.5	31.5	9.5	31.5	9.5
Total Split (s)	43.0	60.3	60.3	14.2	31.5	31.5	9.5	32.0	32.0	13.5	36.0	43.0
Total Split (%)	35.8%	50.3%	50.3%	11.8%	26.3%	26.3%	7.9%	26.7%	26.7%	11.3%	30.0%	35.8%
Maximum Green (s)	38.5	55.8	55.8	9.7	27.0	27.0	5.0	27.5	27.5	9.0	31.5	38.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		20.0	20.0		20.0	20.0		20.0	20.0		20.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	
Act Effct Green (s)	36.8	41.4	41.4	8.1	10.4	10.4	5.0	12.1	12.1	9.1	24.0	65.4
Actuated g/C Ratio	0.43	0.48	0.48	0.09	0.12	0.12	0.06	0.14	0.14	0.11	0.28	0.76
v/c Ratio	0.74	0.16	0.02	0.37	0.46	0.45	0.10	0.54	0.16	0.67	0.27	0.52
Control Delay	29.1	14.4	0.1	45.3	40.0	11.6	44.1	39.5	1.0	58.7	26.9	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.1	14.4	0.1	45.3	40.0	11.6	44.1	39.5	1.0	58.7	26.9	3.4
LOS	C	B	A	D	D	B	D	D	A	E	C	A
Approach Delay		24.0			30.9			33.5			15.7	
Approach LOS		C			C			C			B	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 86.5
Natural Cycle: 115
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.74
Intersection Signal Delay: 22.8 Intersection LOS: C
Intersection Capacity Utilization 65.6% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 21: Warm Springs & Linnel Ln



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	325	1181	164	366	10	1231	1777	181	10	1107	10
Future Volume (vph)	10	325	1181	164	366	10	1231	1777	181	10	1107	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		150	0		0	0		0	0		0
Storage Lanes	2		2	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.88	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	2787	3433	3539	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3539	2787	3433	3539	1583	3433	5085	1583	3433	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			47			117			181			117
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		4370			1699			998			766	
Travel Time (s)		99.3			38.6			22.7			17.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	10	325	1181	164	366	10	1231	1777	181	10	1107	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	10	325	1181	164	366	10	1231	1777	181	10	1107	10
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			8			2			6

23: Winchester Rd & Clinton Keith Rd/Benton Rd

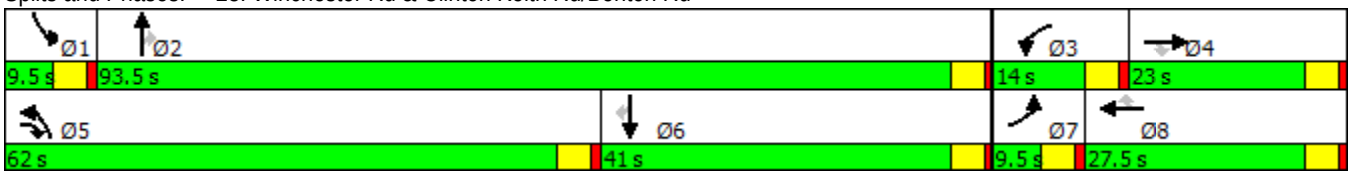
Timing Plan: PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	5	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	9.5	23.0	62.0	14.0	27.5	27.5	62.0	93.5	93.5	9.5	41.0	41.0
Total Split (%)	6.8%	16.4%	44.3%	10.0%	19.6%	19.6%	44.3%	66.8%	66.8%	6.8%	29.3%	29.3%
Maximum Green (s)	5.0	18.5	57.5	9.5	23.0	23.0	57.5	89.0	89.0	5.0	36.5	36.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	Max
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0			11.0	11.0		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0			0	0		0	0		0	0
Act Effct Green (s)	5.0	16.6	76.3	9.3	28.6	28.6	55.2	94.7	94.7	5.0	36.8	36.8
Actuated g/C Ratio	0.04	0.12	0.56	0.07	0.21	0.21	0.41	0.70	0.70	0.04	0.27	0.27
v/c Ratio	0.08	0.75	0.75	0.70	0.49	0.02	0.88	0.50	0.16	0.08	0.80	0.02
Control Delay	66.7	69.6	24.9	79.2	50.8	0.1	46.4	10.7	1.5	66.7	52.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.7	69.6	24.9	79.2	50.8	0.1	46.4	10.7	1.5	66.7	52.3	0.1
LOS	E	E	C	E	D	A	D	B	A	E	D	A
Approach Delay		34.7			58.5			24.0			51.9	
Approach LOS		C			E			C			D	

Intersection Summary

Area Type: Other
Cycle Length: 140
Actuated Cycle Length: 136
Natural Cycle: 100
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.88
Intersection Signal Delay: 34.4 Intersection LOS: C
Intersection Capacity Utilization 85.8% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 23: Winchester Rd & Clinton Keith Rd/Benton Rd



APPENDIX C – MODEL DEVELOPMENT AND VALIDATION REPORT

Model Development and Validation

For the City of Murrieta General Plan Update (Murrieta Model)

DRAFT

April 2019

Submitted to:

Murrieta
the future of southern california

10173.19 | Prepared by **Iteris, Inc.**

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ACRONYMS

BPR	Bureau of Public Roads
BRT	Bus Rapid Transit
CEQA	California Environmental Quality Act
FHWA	Federal Highway Administration
FTIP	Federal Transportation Improvement Plan
GHG	Greenhouse Gas
GIS	Geographic Information System
HBCU	Home-Based College and University
HBO	Home-Based Other
HBSC	Home-Based School
HBSH	Home-Based Shopping
HBSP	Home-Based Serving Passenger
HBSR	Home-Based Social-Recreational
HBW	Home-Based Work
HBWD	Home-Based Work Direct
HBWS	Home-Based Work Strategic
HOT	High-Occupancy Toll
HOV	High-Occupancy Vehicle
I	Interstate
MPH	Miles Per Hour
NCHRP	National Cooperative Highway Research Program
OBO	Other-Based Other
PeMS	Performance Measurement System
RTP	Regional Transportation Plan
RTP/SCS	Regional Transportation Plan/Sustainable Communities Solutions
SB	Senate Bill
SCAG	Southern California Association of Governments
SED	Socioeconomic data
SMDT	Sub-regional Model Development Tool
SR	State Route
TAZ	Transportation Analysis Zone
TDF	Travel Demand Forecasting
US	United States
V/C	Volume to Capacity
VDF	Volume Delay Function
VHD	Vehicle Hours of Delay
VHT	Vehicle Hours Traveled
VMT	Vehicle Miles Traveled
WBO	Work-Based Other

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1 OVERVIEW

This report summarizes the results for development of the City of Murrieta model (Model) for use in the General Plan Update. The Model is a city-wide model consistent with the regional model. The Model was developed to address transportation impact assessments, vehicle miles traveled (VMT) forecasts for CEQA analysis, and air quality greenhouse gas (GHG) applications.

1.1 Model Description

The base year of 2016 and the forecast year of 2040 were obtained from the 2016 SCAG RTP/SCS travel demand model. The model consists of a focused travel demand forecasting (TDF) model for the City of Murrieta. The Model was developed using the TransCAD software package, the software platform currently used by SCAG for regional modeling. The City's highway network was updated and refined to include all key general plan roadways in the City of Murrieta. The transit network was also reviewed and found to be a satisfactory representation of transit services. The Model is consistent with the traditional four step modeling process, which includes trip generation, trip distribution, mode split, and traffic assignment. The following sections provide an overview of the Model and the steps that were followed in development and validation.

Appendix A is the full documentation of the 2016 SCAG RTP/SCS travel demand model, which is referred to in this document as the "2016 SCAG Model".

1.2 SCAG 2016 Sub-Regional Model Development Tool (SMDT)

A prototype model (for existing and forecast conditions) was developed by SCAG and first used for this Model update. The existing year (2016) and forecast year (2040 baseline) were developed using the subarea model development tool (SMDT) which was developed for SCAG by Caliper. The purpose of the SMDT is to efficiently develop sub-regional models while promoting collaboration and consistency within the modeling practice in the SCAG region. The SMDT process consists of four components:

- Zone Definition Tool
- Data Conversion Tool
- Socioeconomic Data (SED) Estimation Tool
- Sub-regional Model Prototype (which is a model executable add-in in TransCAD)

The Model consists of the same stages as the SCAG regional trip-based model:

- Initialization
- Network Skimming
- Trip Generation
- Trip Distribution
- Modal Split
- Time of Day Model
- Trip Assignment

Additional information on the SCAG SMDT can be found in **Appendix B**.

2 MODEL COMPONENTS

This section of the report documents model inputs, variables, and parameters used in the Model. The review and revision of the model variables discussed in this memo was an ongoing process throughout the development and validation of the 2016 Base Year model calibration. The intention of modifying variables or parameters is to ensure that the model is tailored to meet the needs of the City of Murrieta in supporting local projects. Model inputs, variables, and parameters used within the Model are important to define and validate to ensure that the Model closely replicates existing travel within the City.

This section of the report is intended to document any modifications to model inputs, variables, or parameters, as necessary for model validation and calibration activities.

2.1 Transportation Analysis Zones

Transportation analysis zones (TAZs) are geographic areas dividing the City into relatively similar areas of land use or land activity. TAZs are relatively homogenous in character and usually lie along major roadways, follow significant physical features, and City boundaries. The TAZ structure for the Model was obtained by beginning with the SCAG Tier 2 zones, then disaggregating to be more consistent with the previous City of Murrieta model zone structure.

The Model has a total of 294 zones. **Figure 2-1** illustrates the zone structure within the Model. Detailed zone structure figures are included in **Appendix C**. **Table 2-1** summarizes the City of Murrieta socioeconomic totals.

Table 2-1: Total Existing Socioeconomic Inputs

SOCIOECONOMIC VARIABLE	BASE YEAR (2016)
Population	106,185
Households	33,796
Employment	27,735

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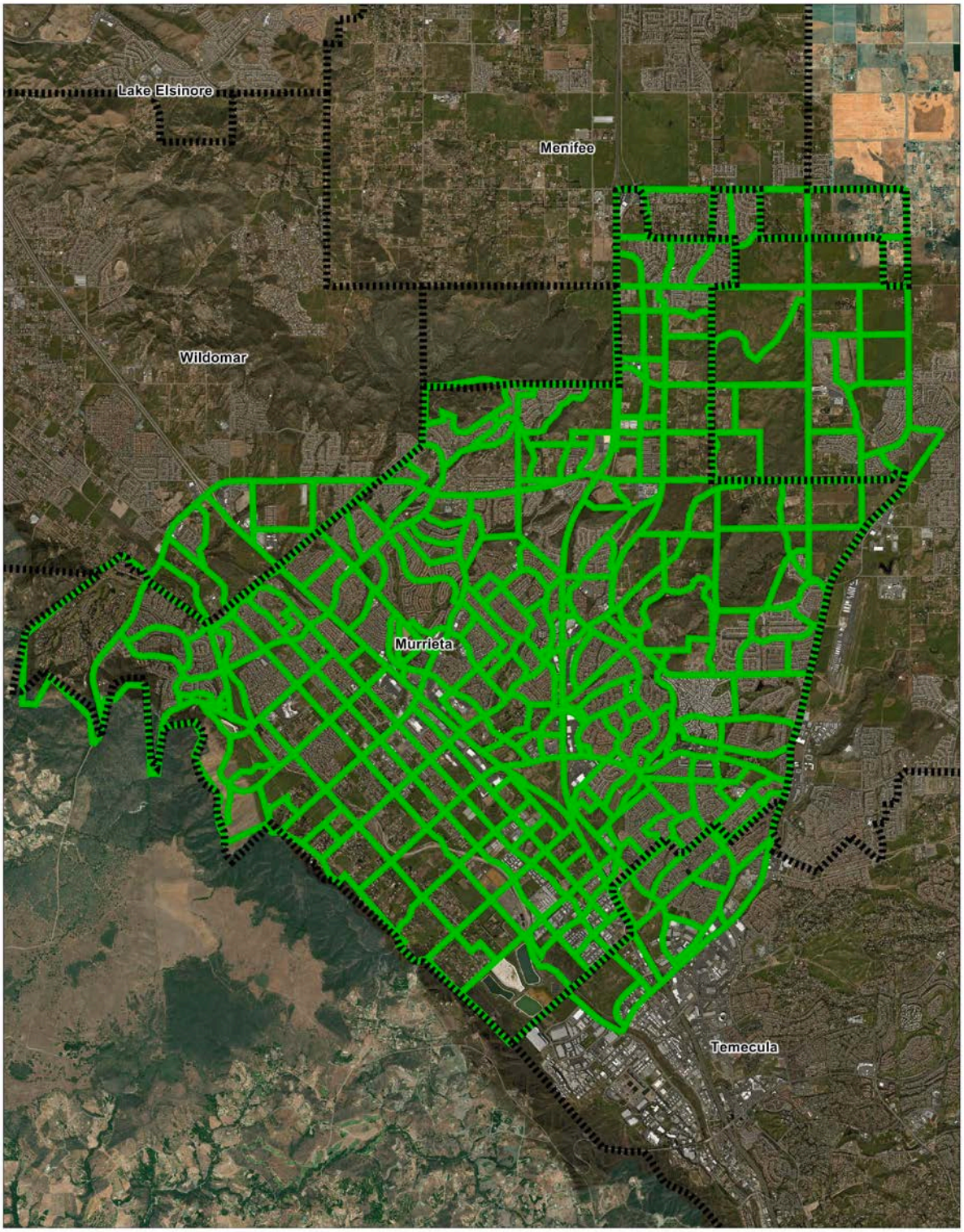
Figure 2-1: TAZ Structure



2.2 Networks

The baseline base year (2016) and forecast year (2040) networks were obtained from SCAG through the development of the subregional model. The process for network development was to obtain both highway and transit networks directly from the SMDT and make updates to those networks.

2.2.1 Highway Network

The highway network was obtained from the 2016 SCAG Model and then updated to include any missing links using the previous City of Murrieta model. The model network is discussed in depth in the 2016 SCAG Model documentation, included in **Appendix A**. **Table 2-2** summarizes the lane miles of facilities within the model.

Table 2-2: Lane Miles of Facility (Year 2016)

FACILITY TYPE CLASSIFICATION	LANE MILES (YEAR 2016)
Freeway & HOV	68
Principal Arterial & Expressway/Parkway	7
Minor Arterial	116
Major Collector	110
Minor Collector	27
Ramps	14
Trucks Only	0
Total Length	**341**

Figure 2-2 illustrates the updated base year highway network.

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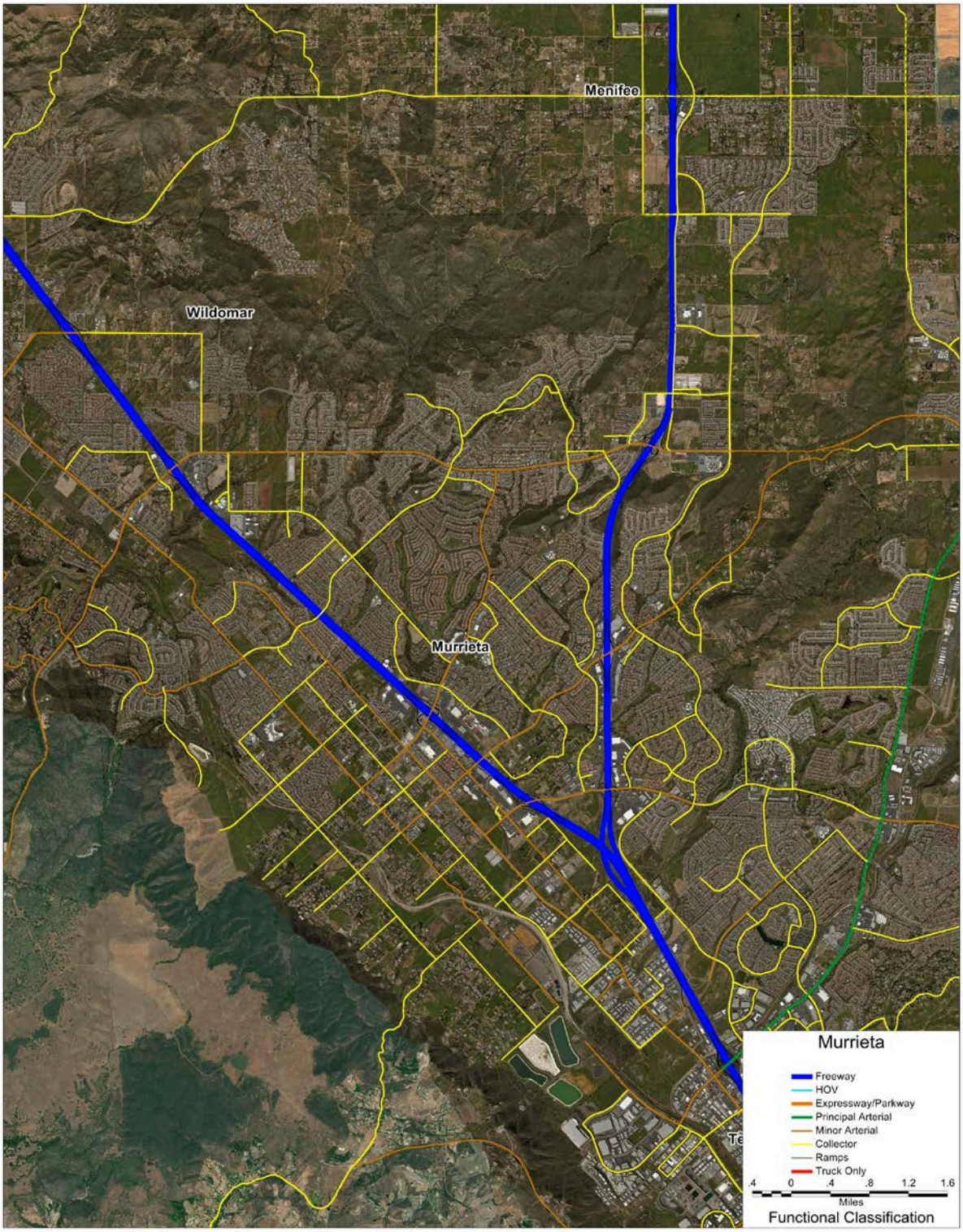
Figure 2-2: Base Year Network (2016)



2.2.2 Centroids

An initial review of all centroids connected to intersections was completed, and these centroids were adjusted to connect to roadways, rather than intersections. Additionally, after local streets from the previous model were added into the network, centroids were adjusted using aerial photography to connect to the most likely location. These adjustments were included in the base year network, and were also transferred to the forecast no build network.

2.2.3 Transit Networks

By using the SCAG SMDT, the updated model inherits the transit capabilities within the regional 2016 SCAG Model. **Figure 2-3** illustrates the base year model transit network.

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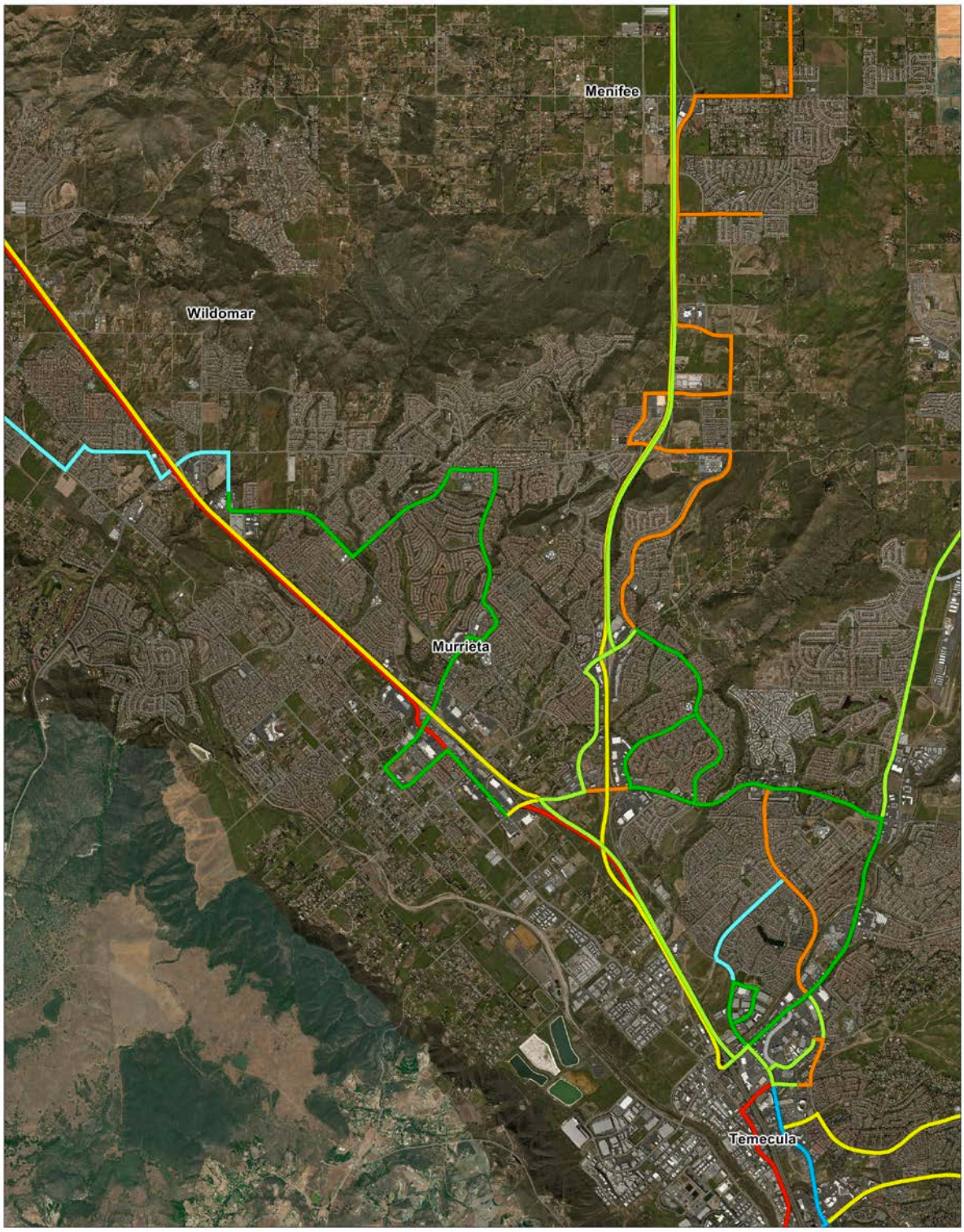
Figure 2-3: Base Year Transit Network



2.3 Trip Generation

The process of trip generation estimates daily person trips for average weekday conditions by trip type. Trip productions and trip attractions are estimated for each zone based on socioeconomic variables calculated in the land use to socioeconomic tool. Trip generation procedures in the model are largely consistent with trip generation as documented in the 2016 SCAG Model documentation, included in **Appendix A**.

2.3.1 Auto Availability

The 2016 SCAG Model uses an auto availability measure as a method of estimating household-based trips. Auto availability is stratified into 0, 1, 2, 3, and 4+ vehicles per household. A full documentation of auto availability is included in **Appendix A**. **Table 2-3** summarizes the auto availability coefficients used within the updated model.

Table 2-3: Auto Availability

AUTO AVAILABILITY	AUTO AVAILABILITY CHOICE COEFFICIENT
0 Cars	-0.3269
1 Car	2.3856
2 Cars	2.3831
3 Cars	2.6609
4+ Cars	2.4108

2.3.2 Trips by Purpose

Trip Purposes in the model were inherited from the SMDT, and are summarized in **Table 2-4**. **Table 2-5** through **Table 2-11** summarize the trip production and attraction rates by purposes based on a variety of model variables.

Table 2-4: Trip Purposes

TRIP PURPOSE	CURRENT TRIP PURPOSE	UPDATED	
		TRIP PURPOSE	TRIP PURPOSE DESCRIPTION
Home-Based Work	Home-Based Work (HBW)	Home-Based Work Direct (HBWD)	HBWD trips go directly between home and work without intermediate stops.
		Home-Based Work Strategic (HBWS)	HBWS trips go to intermediate locations on the way to their work destination.
Home-Based School		Home-Based School (HBSC)	HBSC trips include all trips related to students with activity at the home end of the trip and a trip to a K-12 activity at the other end of the trip.
Home-Based College and University		Home-Based College and University (HBCU)	HBCU trips are all trips related to students over the age of 18 with activity at the home end of the trip and activity at a college or university at the other end of the trip.
Home-Based Shopping	Home-Based Shopping (HBS)	Home-Based Shopping (HBSH)	HBSH trips go between a home activity and a shopping activity at the other end of the trip.

TRIP PURPOSE	CURRENT TRIP PURPOSE	UPDATED	
		TRIP PURPOSE	TRIP PURPOSE DESCRIPTION
Home-Based Social-Recreational		Home-Based Social-Recreational (HBSR)	HBSR trips go between a home activity and a visit to a recreational or social activity at the other end.
Home-Based Serving-Passenger		Home-Based Serving Passenger (HBSP)	HBSP trips go between a home activity and a destination which serves a vehicle passenger trip. HBSP trips do not include HBW trips which make intermediate stops.
Home-Based Other	Home-Based Other (HBO)	Home-Based Other (HBO)	HBO trips go between a home activity and a destination that does not classify as work, school, college, university, shopping, recreational, or serving a passenger.
Work-Based Other	Other-Based Work (OBW)	Work-Based Other (WBO)	WBO trips go between a work activity and an activity that is not a home-based activity. An example of WBO trips would be to run an errand during a lunch break.
Other-Based Other	Other-Based Other (OBO)	Other-Based Other (OBO)	OBO trips go between two activities which are not classified as home-based or work-based.

Table 2-5: HBWD (Home-Based Work Direct) Trip Production Rates

NUMBER OF WORKERS	AGE OF HEAD OF HOUSEHOLD	HOUSEHOLD INCOME ($2011)			
		<$35,000	$35,000 TO $75,000	$75,000 TO $150,000	>$150,000
1	18-24	2.44	2.65	2.83	2.85
1	25-44	2.90	2.87	2.85	2.84
1	45-64	2.52	2.58	2.59	2.84
1	65+	2.52	2.62	2.56	2.70
2	18-24	4.41	4.29	4.32	4.34
2	25-44	4.86	4.86	5.06	5.21
2	45-64	4.93	5.05	5.07	5.05
2	65+	4.65	5.37	5.05	4.97
3+	18-24	6.11	6.45	6.68	6.74
3+	25-44	7.29	8.22	8.44	8.29
3+	45-64	7.44	7.89	8.13	8.04
3+	65+	6.65	6.81	7.14	7.37

Table 2-6: HBWS (Home-Based Work Strategic) Trip Production Rates

NUMBER OF WORKERS	AGE OF HEAD OF HOUSEHOLD	HOUSEHOLD INCOME ($2011)			
		<$35,000	$35,000 TO $75,000	$75,000 TO $150,000	>$150,000
1	18-24	0.08	0.07	0.07	0.07
1	25-44	0.11	0.12	0.13	0.14
1	45-64	0.10	0.10	0.11	0.13
1	65+	0.10	0.07	0.09	0.10
2	18-24	0.18	0.20	0.20	0.20
2	25-44	0.22	0.22	0.27	0.26
2	45-64	0.21	0.21	0.24	0.25
2	65+	0.12	0.13	0.23	0.25
3+	18-24	0.22	0.23	0.24	0.24
3+	25-44	0.27	0.30	0.28	0.32
3+	45-64	0.25	0.27	0.28	0.31
3+	65+	0.20	0.21	0.20	0.21

Table 2-7: HBSC (Home-Based School) Trip Production Rates

NUMBER OF HOUSEHOLD MEMBERS 5-17 YEARS OLD	TRIP RATE
0	0.06
1	0.63
2	0.92
3+	1.71

Table 2-8: HBCU (Home-Based College/University) Trip Production Rates

HOUSEHOLD INCOME ($2011)	NUMBER OF HOUSEHOLD MEMBERS 17 TO 25 YEARS OLD		
	0	1	2+
<$35,000	0.02	0.14	0.19
$35,000 to $75,000	0.04	0.15	0.22
$75,000 to $150,000	0.02	0.15	0.22
>$150,000	0.02	0.15	0.22

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Table 2-9: HBNW (Home-Based Non-Work) Trip Production Rates

AUTO AVAILABILITY	HOUSEHOLD INCOME	HOUSEHOLD SIZE	TRIP PRODUCTION RATES			
			HBSH (Shopping)	HBSR (Social/ Recreational)	HBSP (Strategic Passenger)	HBO (Other)
0	<$35,000	1	0.16	0.16	0.02	0.28
		2	0.29	0.28	0.06	0.43
		3	0.26	0.32	0.45	0.58
		4+	0.50	0.44	0.32	0.82
	$35,000 to $75,000	1	0.10	0.16	0.02	0.28
		2	0.18	0.28	0.05	0.43
		3	0.26	0.32	0.44	0.58
		4+	0.46	0.44	0.32	0.84
	$75,000 to $150,000	1	0.10	0.16	0.02	0.28
		2	0.17	0.29	0.05	0.43
		3	0.26	0.32	0.43	0.58
		4+	0.46	0.44	0.31	1.16
	>$150,000	1	0.10	0.16	0.02	0.28
		2	0.17	0.29	0.05	0.43
		3	0.26	0.32	0.43	0.58
		4+	0.46	0.44	0.30	1.16
1	<$35,000	1	0.16	0.18	0.04	0.32
		2	0.31	0.35	0.18	0.46
		3	0.37	0.48	0.55	0.61
		4+	0.66	0.60	1.14	0.84
	$35,000 to $75,000	1	0.12	0.22	0.03	0.32
		2	0.25	0.36	0.14	0.46
		3	0.29	0.49	0.54	0.62
		4+	0.53	0.67	1.10	0.86
	$75,000 to $150,000	1	0.12	0.22	0.02	0.32
		2	0.22	0.37	0.12	0.48
		3	0.29	0.50	0.54	0.63
		4+	0.53	0.80	1.06	1.19
	>$150,000	1	0.12	0.23	0.02	0.32
		2	0.26	0.37	0.05	0.53
		3	0.29	0.51	0.53	0.74
		4+	0.53	0.82	1.05	1.19
2	<$35,000	1	0.18	0.19	0.02	0.33
		2	0.31	0.37	0.11	0.58
		3	0.37	0.52	0.44	0.61
		4+	0.51	0.67	1.11	0.99
	$35,000 to $75,000	1	0.12	0.22	0.02	0.35
		2	0.28	0.38	0.08	0.50
		3	0.29	0.53	0.43	0.62

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AUTO AVAILABILITY	HOUSEHOLD INCOME	HOUSEHOLD SIZE	TRIP PRODUCTION RATES			
			HBSH (Shopping)	HBSR (Social/ Recreational)	HBSP (Strategic Passenger)	HBO (Other)
		4+	0.41	0.75	1.07	1.01
	$75,000 to $150,000	1	0.12	0.24	0.02	0.36
		2	0.25	0.38	0.06	0.56
		3	0.29	0.54	0.25	0.71
		4+	0.35	0.82	1.03	1.26
	>$150,000	1	0.12	0.24	0.02	0.36
		2	0.23	0.39	0.07	0.48
		3	0.29	0.54	0.22	0.74
		4+	0.35	0.94	1.03	1.30
3+	<$35,000	1	0.18	0.26	0.02	0.33
		2	0.31	0.42	0.13	0.58
		3	0.45	0.53	0.22	0.69
		4+	0.51	0.75	1.00	0.99
	$35,000 to $75,000	1	0.16	0.26	0.02	0.35
		2	0.29	0.43	0.10	0.50
		3	0.30	0.54	0.15	0.73
		4+	0.55	0.76	0.96	1.22
	$75,000 to $150,000	1	0.16	0.26	0.02	0.36
		2	0.29	0.44	0.09	0.52
		3	0.30	0.54	0.11	0.74
		4+	0.42	0.84	0.93	1.26
	>$150,000	1	0.16	0.26	0.02	0.06
		2	0.24	0.44	0.08	0.54
		3	0.47	0.56	0.11	0.74
		4+	0.42	0.94	0.92	1.30

Table 2-10: WBO (Work-Based Other) Trip Production Rates

WORKERS PER HOUSEHOLD	HOUSEHOLD SIZE	HOUSEHOLD INCOME ($2011)			
		<$35,000	<$35,000	<$35,000	<$35,000
1	1	0.15	0.18	0.24	0.24
	2	0.12	0.31	0.28	0.22
	3	0.16	0.30	0.29	0.25
	4+	0.16	0.16	0.17	0.24
2	2	0.29	0.35	0.38	0.36
	3	0.30	0.35	0.59	0.59
	4+	0.30	0.26	0.32	0.37
3+	3	0.18	0.18	0.25	0.66
	4+	0.20	0.20	0.43	0.80

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Table 2-11: OBO (Other-Based Other) Trip Production Rates

HOUSEHOLD INCOME	HOUSEHOLD SIZE	AUTO AVAILABILITY			
		0	1	2	3+
<$35,000	1	0.17	0.52	0.54	0.56
	2	0.40	0.75	0.77	0.78
	3	0.57	0.93	0.95	0.96
	4+	1.03	1.39	1.41	1.42
$35,000 to $75,000	1	0.18	0.57	0.59	0.61
	2	0.42	0.79	0.81	0.83
	3	0.60	0.98	1.00	1.02
	4+	1.08	1.45	1.46	1.48
$75,000 to $150,000	1	0.17	0.55	0.57	0.59
	2	0.41	0.78	0.80	0.82
	3	0.58	0.95	0.97	0.99
	4+	1.06	1.43	1.44	1.46
>$150,000	1	0.18	0.55	0.58	0.60
	2	0.42	0.80	0.81	0.83
	3	0.59	0.97	0.99	1.00
	4+	1.07	1.45	1.46	1.48

2.4 Trip Distribution

Trip distribution procedures in the model are largely consistent with trip distribution as documented in the 2016 SCAG Model documentation, summarized in **Appendix A**. The SCAG model utilizes two methodologies for trip distribution models. The home-based school (HBSC) and home-based college (HBCU) models are gravity models, while the home-based direct and strategic work (HBWD and HBWS), home-based shopping (HBSH), home-based social/recreational (HBSR), home-based strategic passenger (HBSP), home-based other (HBO), work-based other (WBO), and other-based other (OBO) purposes trips use destination choice models. The gravity model is summarized in **Appendix A**. The utility for destination choice is also summarized in **Appendix A**.

2.5 Mode Choice

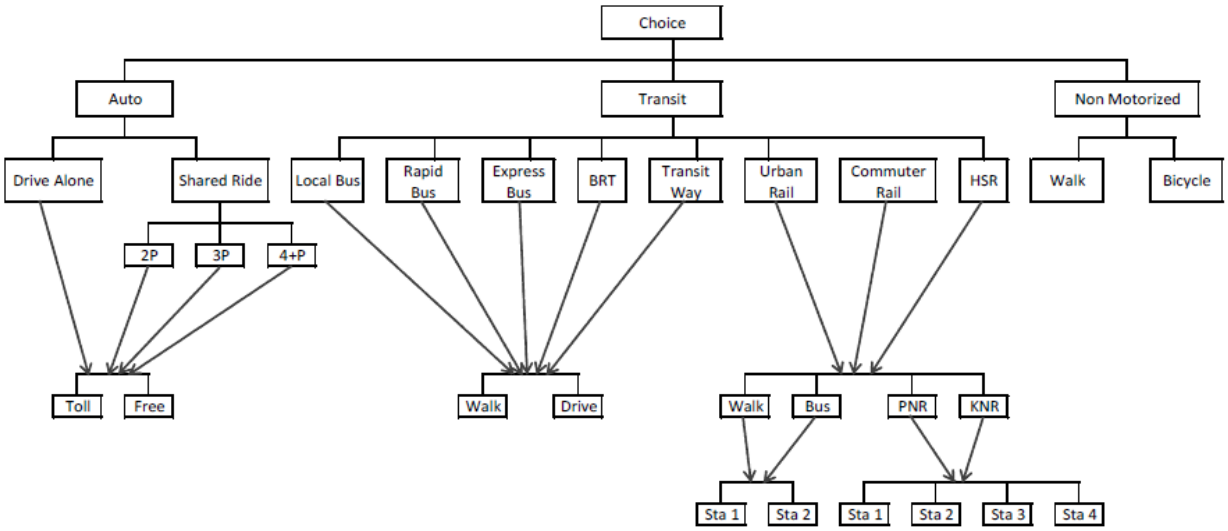
Mode choice procedures in the model are consistent with mode choice as documented in the 2016 SCAG Model documentation, summarized in **Appendix A**. The "mode choice" component of a travel demand model identifies what mode of travel is used to make the total trips generated for each zone. During mode choice, trips are proportioned into the following modes of travel:

- **Auto (toll or free trips)**
  - Drive Alone
  - Shared Ride (2 persons, 3 persons, or 4+ persons)
- **Transit**
  - Local bus
  - Rapid Bus
  - Express Bus
  - BRT

- **Non-motorized**
  - Walk
  - Bike
  - Transit Way
  - Urban Rail
  - Commuter Rail
  - High-Speed Rail

Figure 2-4 illustrates the mode choice nested logit model structure used in the model.

Figure 2-4: SCAG Mode Choice Model Nested Logit Model Structure



2.6 Time of Day Factoring

Time of day procedures in the Updated model are largely consistent with time of day as documented in the 2016 SCAG Model documentation, summarized in **Appendix A**. The model uses five time periods for highway assignment. The five highway assignment time periods are as follows:

- AM Peak Period = 6:00 AM to 9:00 AM
- Midday Time Period = 9:00 AM to 3:00 PM
- PM Peak Period = 3:00 PM to 7:00 PM
- Evening Time Period = 7:00 PM to 9:00 PM
- Night-time Period = 9:00 PM to 6:00 AM

2.7 Traffic Assignment

Traffic assignment procedures in the model are largely consistent with traffic assignment as documented in the 2016 SCAG Model documentation, summarized in **Appendix A**. Traffic assignment is the final step in the four step travel demand modeling process is the assignment of the vehicle trip tables to the highway network. The traffic assignment process chooses the specific travel route between zone pairs for any given trip for each time period.

Traffic assignment utilizes a generalized cost function to build travel paths. The generalized cost function is

based on travel time, high-occupancy toll (HOT) lane perceived penalties, auto operating costs, toll values, and a cost conversion factor. The generalized cost function is detailed in **Appendix A**.

The volume delay function that is used for the model is the Bureau of Public Roads (BPR function, and is used to create a correlation between traffic volume, congestion delay, and congested speeds. The VDF function is identical to the VDF function used in the SCAG Model, and is detailed in **Appendix A**.

2.8 Air Quality Data Module

Recent CEQA guidelines (SB 743) are directing a shift from a level-of-service (LOS) analysis to a greenhouse gas (GHG) or vehicle-miles-traveled (VMT) based analysis. In addition, transportation models are increasingly being used to develop VMT attributable to individual Cities or Districts to meet the Climate Action Plan (CAP) requirements of SB 375. The air quality data module within the model permits the generation of zonal-based VMT as well as link based VMT to support air quality analysis. A full set of model outputs for the base year model air quality summary is included in **Appendix D**.

2.8.1 Zone-Based VMT

A zone-based VMT calculation identifies the total number of trips produced by, or attracted to, a zone and uses the model distance "skims" to calculate a VMT. The "skim" is a matrix generated by the model that represents the zone to zone travel distances and travel times for the entire model area.

Daily VMT by zone is calculated by multiplying the origin-destination trip tables by travel distance "skims" from the highway assignment for each time periods separately. Each time period is calculated separately because travel paths between origin and destination (and the resulting VMT) can vary due in congested versus uncongested travel conditions. The time periods are summed together to calculate the daily VMT. VMT is calculated separately to autos and trucks to facilitate air quality analysis which typically need this breakdown. Zone-based VMT is calculated for four different categories:

- Travel wholly within the jurisdiction boundary (Internal to Internal)
- Trips originating within the jurisdiction but ending outside the jurisdiction (Internal to External)
- Trips originating outside the jurisdiction and ending inside the jurisdiction (External to Internal)
- Trips with origins and destinations outside the jurisdiction (External to External)

For the purposes of a CAP the VMT associated with "External to External" trips are not attributable to the jurisdiction. By convention only 50% of the VMT associated with "Internal to External" and "External to Internal" trips are allocated to the jurisdiction itself and the other 50% allocated to the non-jurisdiction (or "external") end on the trip.

For the trips to and from the San Diego external station, trips are assumed to travel an average of 40 miles into San Diego County.

As summarized in **Table 2-12**, approximately 10% of VMT within the City of Murrieta is attributed to internal to internal trips, and 90% of VMT is associated with internal to external trips. A complete summary of air quality and trip performance data is summarized in **Appendix D**.

Table 2-12: Base Year VMT (in 1,000s) Matrix

	EXTERNAL*	INTERNAL (MURRIETA)
External*	N/A	1,899,000
Internal (Murrieta)	1,818,600	419,100
	Sum of Internal to Internal VMT (in 1,000s)	419,000
	Sum of Internal to External VMT (in 1,000s)	3,718,000
	%Internal to Internal	10.1%
	%Internal to External	89.9%

*Note that half of the VMT is attributed to the external area

2.8.2 Link-Based VMT

Traditional VMT calculations are link-based and include all the links within an area. This includes trip generated within that area as well as through trips. An advantage of the link-based methodology compared to the Zone-based method is that VMT by "speed bin" an important input to air quality model, can be calculated.

The model calculates VMT by speed bin for five miles per hour speed increments for each time period separately then adds together for derive daily VMT by speed bin. Speed bin and summary VMT data is calculated in a spreadsheet tool. City-wide air quality summary data is included in **Table 2-13**. **Table 2-14** summarizes regional VMT by facility type. A complete summary of air quality and trip performance data is summarized in **Appendix D**.

Table 2-13: Base Year Air Quality Summary by Speed Bin

SPEED RANGE	AM PEAK PERIOD 6 AM TO 9 AM	MIDDAY PERIOD 9 AM TO 3 PM	PM PEAK PERIOD 3 PM TO 7 PM	EVENING PERIOD 7 PM TO 9 PM	NIGHTTIME PERIOD 9 PM TO 6 AM	AVERAGE DAILY	PERCENT OF TRAVEL
0 - 5 MPH	125	0	0	0	0	125	0.0%
5 - 10 MPH	231	472	2,321	0	0	3,023	0.1%
10 - 15 MPH	3,723	2,388	5,217	400	0	11,728	0.5%
15 - 20 MPH	8,225	2,346	10,856	557	47	22,030	0.9%
20 - 25 MPH	11,888	8,858	26,556	1,331	999	49,633	2.1%
25 - 30 MPH	23,542	28,042	59,437	5,859	4,459	121,339	5.2%
30 - 35 MPH	51,511	71,511	93,600	14,422	17,195	248,240	10.6%
35 - 40 MPH	86,466	186,555	178,209	45,391	45,075	541,696	23.2%
40 - 45 MPH	77,467	66,654	70,601	18,254	21,148	254,122	10.9%
45 - 50 MPH	34,147	130,951	47,103	5,331	6,956	224,488	9.6%
50 - 55 MPH	29,423	40,830	5,470	42,967	75,595	194,285	8.3%
55 - 60 MPH	32,067	0	95,839	0	0	127,906	5.5%
60 - 65 MPH	12,913	0	25,018	0	0	37,932	1.6%
65 - 70 MPH	30,537	125,592	33,970	0	0	190,100	8.2%
70 - 75 MPH	30,914	90,754	29,728	51,765	102,232	305,393	13.1%
75 - 80 MPH	0	0	0	0	0	0	0.0%
VMT - Total	**433,179**	**754,953**	**683,925**	**186,277**	**273,706**	**2,332,041**	**100.0%**

*Note: Total values may differ slightly from **Table 2-14** due to rounding.

Table 2-14: Base Year Air Quality Summary by Facility Type

FACILITY TYPE	AM PEAK PERIOD 6 AM TO 9 AM	MIDDAY PERIOD 9 AM TO 3 PM	PM PEAK PERIOD 3 PM TO 7 PM	EVENING PERIOD 7 PM TO 9 PM	NIGHTTIME PERIOD 9 PM TO 6 AM	AVERAGE DAILY	PERCENT OF TRAVEL
Freeway	229,876	393,420	345,645	97,096	177,828	1,243,864	53.3%
HOV	0	0	0	0	0	0	0.0%
Expressway/Parkway	0	0	0	0	0	0	0.0%
Principal Arterial	9,099	17,720	13,654	4,938	8,328	53,740	2.3%
Minor Arterial	110,029	204,526	182,698	49,888	51,135	598,277	25.7%
Major Collector	65,275	104,286	108,615	25,462	26,072	329,711	14.1%
Minor Collector	7,075	13,037	14,309	3,038	2,987	40,445	1.7%
Ramp	11,825	21,963	19,004	5,855	7,355	66,003	2.8%
Trucks Only	0	0	0	0	0	0	0.0%
Total*	**433,179**	**754,953**	**683,925**	**186,277**	**273,706**	**2,332,041**	**100.0%**

*Note: Total values may differ slightly from **Table 2-13** due to rounding.

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3 MODEL VALIDATION

The benefits of using the prototype model developed by SCAG is that the model retains the regional coefficients and parameters. The validation process for the model consists primarily of the assignment process, which is the last and most iterative part of a travel demand model. To validate the model outputs, base-year daily count data were obtained throughout the City to compare the observed versus estimated traffic volumes on the highway network. The primary source for freeway mainline and ramp traffic volume data was obtained from Caltrans (both annual traffic count data as well as Performance Measurement System (PeMS).

3.1.1 Screenline Comparison

Screenlines are imaginary lines drawn across sections of roadways to assess the overall performance of the model by comparing the total model assigned volumes and total actual counts for specific screenline locations. All model links (segments) cross a screenline form a group of roadways within a corridor for which the total model produced volumes and ground traffic counts are aggregated and compared. Eleven screenlines (illustrated in **Figure 3-1**) were identified across different locations in the County:

- 1: North of Clinton Keith
- 2: South of Clinton Keith
- 3: North of Murrieta Hot Springs
- 4: South of Murrieta Hot Springs
- 5: West of I-15
- 6: East of I-15
- 7: West of I-215
- 8: East of I-215

Individual link volumes were summed from both the model and the ground counts across all screenlines. **Table 3-1** summarizes the existing counts and assigned traffic volume flows across each screenline, and also the percentage difference between the two. As shown in the table, all screenlines have the assigned volumes within the acceptable industry validation standards.

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Figure 3-1: Screenline Locations

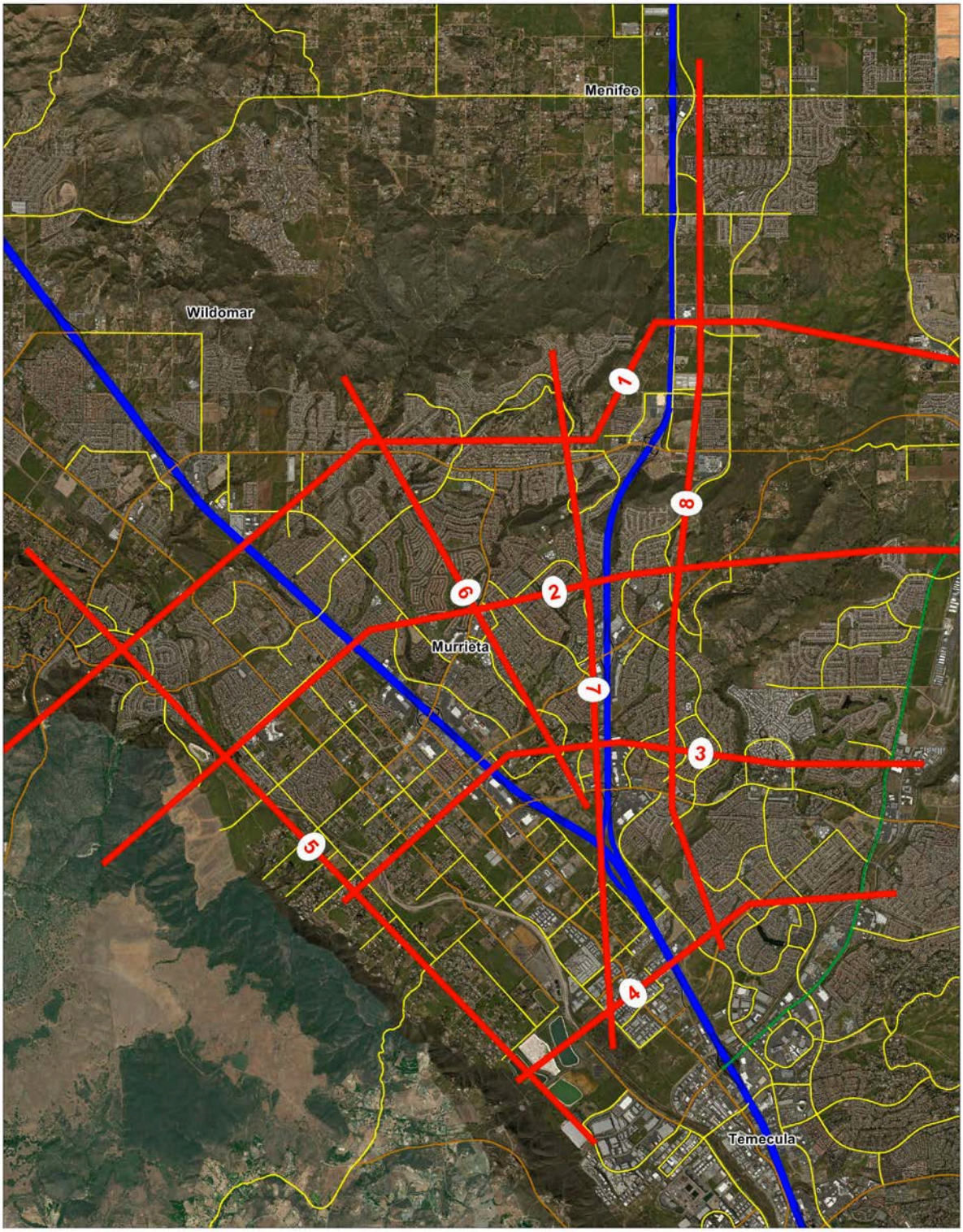


Table 3-1: Screenline Validation

NUMBER	NAME	DIRECTION	NUMBER OF COUNTS	TOTAL SUM OF COUNTS	TOTAL VOLUME AT LOCATIONS WITH COUNTS	VOLUME/ COUNT RATIO	PASS/FAIL CRITERIA
1	EW - North of Clinton Keith	EB/WB	7	264,825	273,650	1.03	PASS
2	EW - South of Clinton Keith	EB/WB	8	291,665	302,673	1.04	PASS
3	EW - North of Murrieta Hot Springs	EB/WB	7	243,315	245,681	1.01	PASS
4	EW - South of Murrieta Hot Springs	EB/WB	6	275,210	294,505	1.07	PASS
5	NS - West of I-15	NB/SB	0	620	0	N/A	N/A
6	NS - East of I-15	NB/SB	2	27,540	29,308	1.06	PASS
7	NS - West of I-215	NB/SB	4	153,085	176,637	1.15	PASS
8	NS - East of I-215	NB/SB	4	27,335	27,044	0.99	PASS
Combined Screenline Totals			29	1,075,635	1,111,514	1.03	PASS

3.1.2 Count to Volume Comparison

A comparison comprised of observed ground counts and modeled volumes is used to determine the validity of the traffic assignment across all points and facility types in the model. **Table 3-2** summarizes the overall difference between the observed counts and model results by facility type. Caltrans and FHWA provide guidance on the levels of errors that should be accepted in these validation metrics. The guidance in overall deviation in modeled volumes compared to traffic counts is summarized in **Table 3-2**.

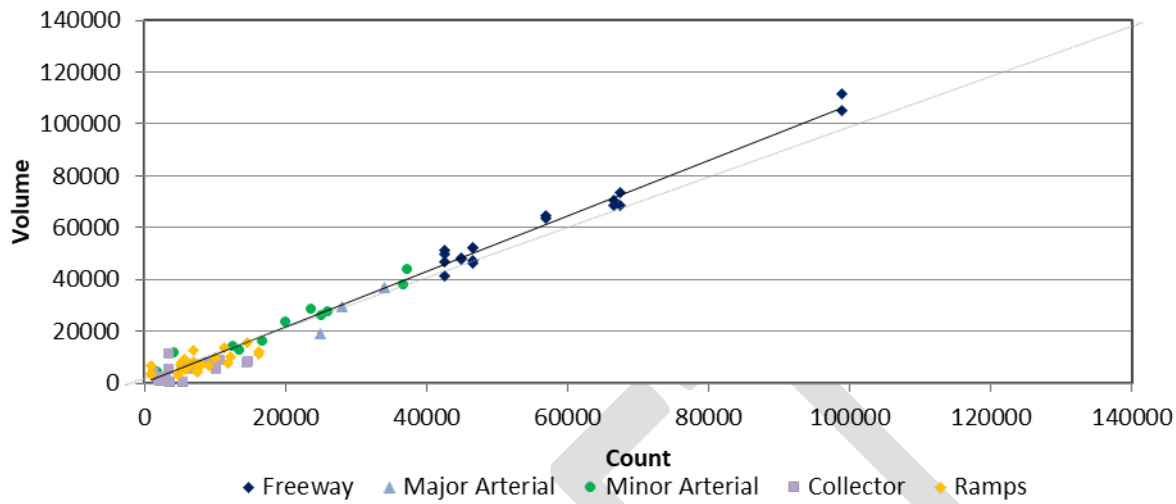
Table 3-2: Count/Volume Comparison By Facility Type

Caltrans and FHWA Criteria:	PASS/FAIL CRITERIA
Freeways +/- 7%	7%
Major Arterials +/- 10%	-2%
Minor Arterials +/- 15%	12%

Note:
Caltrans Criteria is from the Caltrans Travel Forecasting Guidelines, November 1992.
FHWA Criteria was obtained from the Model Validation and Reasonableness Checking Manual.

Figure 3-2 compares the observed volumes to the daily model output volumes for all roadway and highway segments with available counts. **Figure 3-2** illustrates that the count to volume comparison is generally clustered along a 45º fit-line which shows good correlation between actual and observed volumes.

Figure 3-2: Count versus Volume Comparison



3.1.3 Coefficient of Determination (R^2)

Another important measure of comparison for the fit between observed traffic counts and estimated model volumes is the Coefficient of Determination (R^2). The FHWA recommended value of R^2 is greater than 0.88 (*Model Validation and Reasonableness Checking Manual, Travel Model Improvement Program*). The computed overall value of R^2 is 0.98 for the model, which shows that the model's performance is well within reasonable range, representing an excellent fit.

3.1.4 Root Mean Square Error (RMSE)

RMSE is a quadratic scoring rule which measures the average magnitude of the error between observed traffic counts and model predicted volumes. The equation for RMSE is as follows:

$$\%RMSE = \left[\frac{\sum (Model_i - Count_i)^2/(Number\ of\ Counts - 1)^{0.5} * 100}{(\sum Count_i/Number\ of\ Counts)}\right]$$

Both Caltrans and FHWA (through the Travel Model Improvement Program (TIMP) Model Validation and Reasonableness Checking Manual) have recommended guidance for regional RMSE. Caltrans recommended guidance suggests a %RMSE less than 40% and FHWA recommended guidance suggests a %RMSE less than 30%. The validated model %RMSE is 19, which passes both Caltrans and FHWA recommended guidance.

4 FORECAST YEAR MODEL

This section of the report documents the 2040 forecast year model assumptions and results. The 2040 model input files are identical to the validated model files with the exception of the land use and socioeconomic data and network inputs.

4.1 Transportation Analysis Zones

The zone structure of the 2040 forecast year is identical to the zone structure of the base year, with only data inputs being modified. The land use data for each TAZ is converted to three (3) major socioeconomic variables (population, households and employment) and further disaggregated into secondary variables (e.g. household size, age, income level, employment type, etc.). **Table 4-1** summarizes the 2016 and 2040 population, households, and employment totals for the City of Murrieta.

Table 4-1: General Plan Population, Households, and Employment

SOCIOECONOMIC VARIABLE	2016	2040 Preferred Plan	GROWTH %
Population	106,185	141,088	33%
Households	33,796	46,816	39%
Employment	27,735	93,692	238%

4.2 Networks

The process for development of the 2040 network was a multi-step process. The initial network obtained from the 2016 SCAG Model and then updated to include network modifications consistent with the base year model validation. Updates were also made to the network to verify the forecast year baseline network improvements.

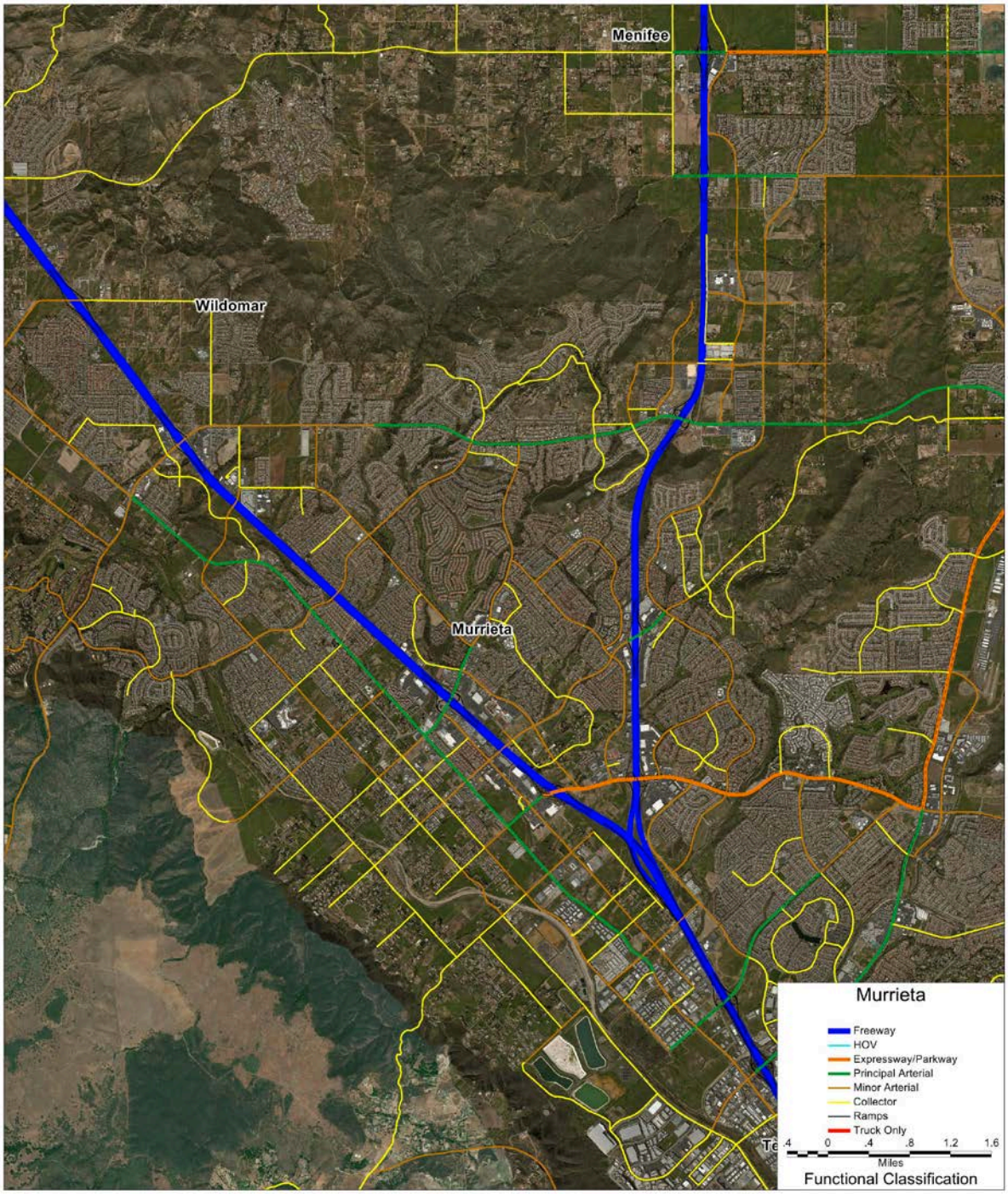
4.2.1 Highway Network

Table 4-2 summarizes the centerline miles of facilities within the City for both the base year and forecast year. **Figure 4-1** illustrates the 2040 forecast year roadway network.

Table 4-2: Updated 2040 Centerline Miles of Facility

FACILITY TYPE CLASSIFICATION	LANE MILES (YEAR 2016)	LANE MILES (YEAR 2040)
Freeway & HOV	68	70
Principal Arterial & Expressway/Parkway	7	106
Minor Arterial	116	214
Major Collector	110	19
Minor Collector	27	83
Ramps	14	24
Trucks Only	0	0
Total Length	341	515

Figure 4-1: Forecast Year Proposed General Plan Roadway Network



4.2.2 Transit Networks

Within the City, there are multiple transit authorities, and modes of transit. **Figure 4-2** illustrates the base year model transit network.

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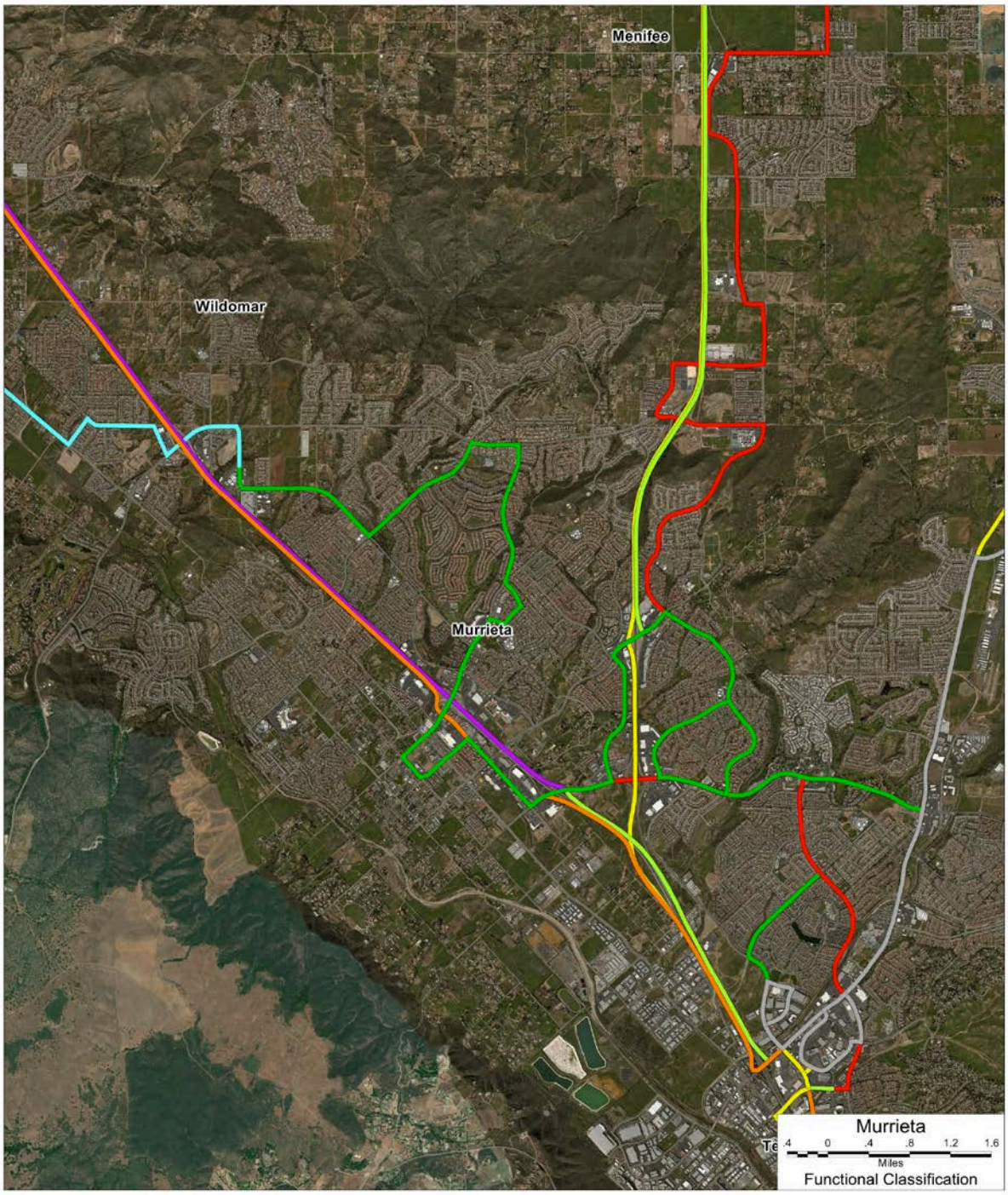
Figure 4-2: Forecast Year Transit Network



4.3 Air Quality Data Module

Consistent with the discussion on the air quality data module in *Section 2.8* of this report, forecast year air quality performance has been developed for zonal based VMT as well as link based VMT. A full set of model outputs for the base year model air quality summary will be included in **Appendix D** of the full document.

4.3.1 Zone-Based VMT

Daily VMT by zone is calculated by multiplying the origin-destination trip tables by travel distance "skims" from the highway assignment for each time periods separately. Each time period is calculated separately because travel paths between origin and destination (and the resulting VMT) can vary due in congested versus uncongested travel conditions. Consistent with methodologies presented in *Section 2.8.1* of this report, only 50% of the VMT associated with "Internal to External" and "External to Internal" trips are allocated to the jurisdiction itself and the other 50% allocated to the non-jurisdiction (or "external") end on the trip.

As summarized in **Table 4-4**, approximately 18% of VMT within the City of Murrieta is attributed to internal to internal trips, and 82% of VMT is associated with internal to external trips. A complete summary of air quality and trip performance data is summarized in **Appendix D**.

Table 4-3: Forecast Year VMT (in 1,000s) Matrix

	EXTERNAL*	INTERNAL (MURRIETA)
External*	N/A	2,390,700
Internal (Murrieta)	2,406,800	1,071,400
	Sum of Internal to Internal VMT (in 1,000s)	1,071,000
	Sum of Internal to External VMT (in 1,000s)	4,798,000
	%Internal to Internal	18.3%
	%Internal to External	81.7%

*Note that half of the VMT is attributed to the external area

4.3.2 Link-Based VMT

Traditional VMT calculations are link-based and include all the links within an area. This includes trip generated within that area as well as through trips. An advantage of the link-based methodology compared to the Zone-based method is that VMT by "speed bin" an important input to air quality model, can be calculated.

The model calculates VMT by speed bin for five miles per hour speed increments for each time period separately then adds together for derive daily VMT by speed bin. Speed bin and summary VMT data is calculated in a spreadsheet tool. City-wide air quality summary data is included in **Table 4-5**. **Table 4-6** summarizes regional VMT by facility type. **Table 4-7** summarizes the overall growth in VMT by time period. A complete summary of air quality and trip performance data is summarized in **Appendix D** of the full report.

Table 4-4: Forecast Year Regional Air Quality Summary by Speed Bin

SPEED RANGE	AM PEAK PERIOD 6 AM TO 9 AM	MIDDAY PERIOD 9 AM TO 3 PM	PM PEAK PERIOD 3 PM TO 7 PM	EVENING PERIOD 7 PM TO 9 PM	NIGHTTIME PERIOD 9 PM TO 6 AM	AVERAGE DAILY	PERCENT OF TRAVEL
0 - 5 MPH	0	0	0	0	0	0	0.0%
5 - 10 MPH	2,024	1,682	9,452	56	0	13,215	0.3%
10 - 15 MPH	4,430	9,821	8,617	592	0	23,459	0.6%
15 - 20 MPH	12,913	17,474	32,207	695	393	63,682	1.7%
20 - 25 MPH	23,847	17,292	54,562	3,488	1,071	100,261	2.6%
25 - 30 MPH	63,369	100,297	126,460	14,336	16,810	321,272	8.4%
30 - 35 MPH	80,166	163,204	191,269	25,241	13,408	473,289	12.4%
35 - 40 MPH	120,448	239,068	220,920	62,000	75,377	717,812	18.8%
40 - 45 MPH	60,852	122,275	79,618	39,612	39,603	341,960	8.9%
45 - 50 MPH	48,078	25,096	90,619	9,703	20,890	194,386	5.1%
50 - 55 MPH	67,792	44,164	123,845	5,739	7,283	248,824	6.5%
55 - 60 MPH	41,260	157,737	45,347	0	0	244,344	6.4%
60 - 65 MPH	49,380	211,397	90,629	13,828	0	365,233	9.5%
65 - 70 MPH	67,544	148,451	30,281	69,886	84,936	401,098	10.5%
70 - 75 MPH	23,927	26,738	6,917	59,612	200,193	317,388	8.3%
75 - 80 MPH	0	0	0	0	0	0	0.0%
VMT - Total	**666,032**	**1,284,696**	**1,110,743**	**304,788**	**459,965**	**3,826,223**	**100.0%**

*Note: Total values may differ slightly from **Table 4-5** due to rounding.

Table 4-5: Forecast Year Regional Air Quality Summary by Facility Type

FACILITY TYPE	AM PEAK PERIOD 6 AM TO 9 AM	MIDDAY PERIOD 9 AM TO 3 PM	PM PEAK PERIOD 3 PM TO 7 PM	EVENING PERIOD 7 PM TO 9 PM	NIGHTTIME PERIOD 9 PM TO 6 AM	AVERAGE DAILY	PERCENT OF TRAVEL
Freeway	296,905	564,754	473,562	143,326	285,130	1,763,677	46.1%
HOV	0	0	0	0	0	0	0.0%
Expressway/Parkway	60,207	125,544	96,747	30,882	36,584	349,965	9.1%
Principal Arterial	92,448	189,796	156,664	43,278	47,343	529,528	13.8%
Minor Arterial	152,927	288,083	273,953	61,951	60,686	837,600	21.9%
Major Collector	6,069	11,262	10,426	2,268	3,364	33,388	0.9%
Minor Collector	26,584	47,386	52,840	10,536	11,128	148,474	3.9%
Ramp	30,891	57,871	46,550	12,547	15,730	163,590	4.3%
Trucks Only	0	0	0	0	0	0	0.0%
Total*	**666,032**	**1,284,696**	**1,110,743**	**304,788**	**459,965**	**3,826,223**	**100.0%**

*Note: Total values may differ slightly from **Table 4-4** due to rounding.

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Table 4-6: Forecast Year Regional Air Quality Summary Growth

MODEL YEAR	AM PEAK PERIOD 6 AM TO 9 AM	MIDDAY PERIOD 9 AM TO 3 PM	PM PEAK PERIOD 3 PM TO 7 PM	EVENING PERIOD 7 PM TO 9 PM	NIGHTTIME PERIOD 9 PM TO 6 AM	AVERAGE DAILY
2016	433,179	754,953	683,925	186,277	273,706	2,332,041
2040 Preferred Plan	666,032	1,284,696	1,110,743	304,788	459,965	3,826,223
Growth (%)	**54%**	**70%**	**62%**	**64%**	**68%**	**64%**

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5 SCENARIO MODELING

This report focused specifically on the base year validation and the forecast year modeled scenarios. The model is developed to be used in scenario modeling to test model forecasts with changes in land uses and roadway assumptions. For the purposes of the General Plan Update, a 2040 With Project and an Existing Plus Project scenario were developed. **Appendix E** briefly describes the approach for developing land use inputs for with project scenarios.

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APPENDIX A – SCAG REGIONAL TRAVEL DEMAND MODEL AND 2012 MODEL VALIDATION

DRAFT

SCAG Regional Travel Demand Model and 2012 Model Validation

March 2016

Southern California Association of Governments

SCAG Regional Travel Demand Model and 2012 Model Validation

March 2016

Funding: The preparation of this report was financed in part through grants from the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA). The contents of this report do not necessarily reflect the official views or policy of the FHWA and FTA.

The contents of this report reflect the views of the author who is responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of SCAG or FHWA or FTA. This report does not constitute a standard, specification or regulation.

SCAG Regional Travel Demand Model and 2012 Model Validation

March 2016

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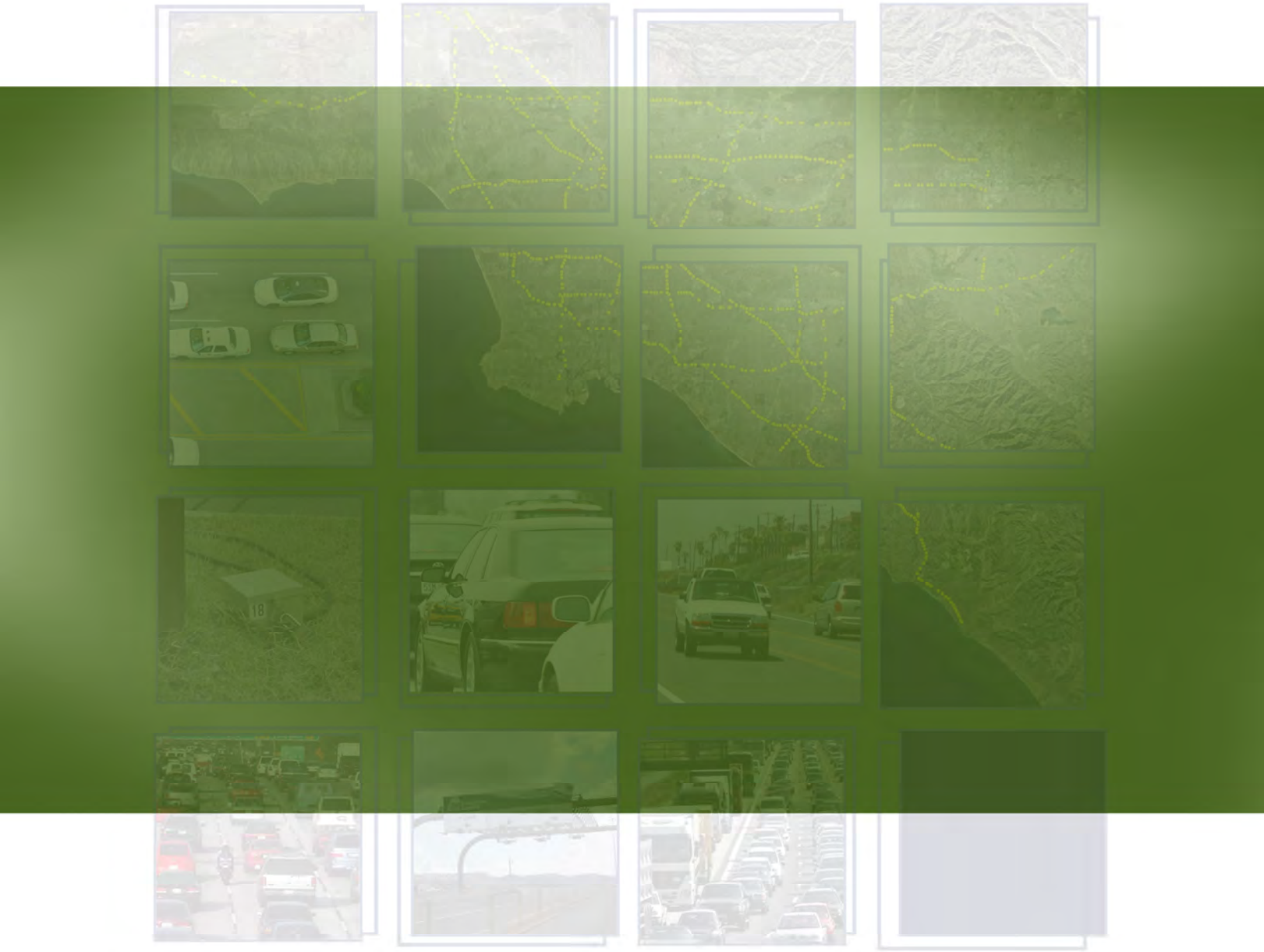
PREFACE



PREFACE

Questions about the content of this report, as well as requests for more detailed information, should be directed to Guoxiong Huang, SCAG's Manager of Regional Transportation Modeling, at (213) 236-1948 or via e-mail at HUANG@scag.ca.gov.The Southern California Association of Governments (SCAG) is a voluntary association of six counties - Los Angeles, Orange, Ventura, Riverside, San Bernardino, and Imperial - and of 191 cities within those counties. SCAG's organizational purpose is cooperative planning and governmental coordination at the regional level. SCAG is mandated by State and federal law to plan and implement a Regional Transportation Plan (RTP) (updated every four years), a bi-annual Federal Transportation Improvement Program (FTIP), and to identify and analyze Transportation Control Measures (TCMs) and Transportation Strategies for incorporation into the South Coast Air Quality Management Plan (AQMP).

This report describes how SCAG forecasts travel behavior for the Southern California Region using computer-based software programs also known as the Regional Transportation Model. The specific focus of this report is on the transportation modeling procedures that have been used to produce travel forecasts for the Year 2012, including recent enhancements to the model to augment its capabilities in addressing policy directives and other transportation programs.

Year 2012 is the base year for the transportation planning period and the current Regional Transportation Model. This model base year is also being applied as part of the Regional Transportation Plan/ Sustainable Communiuties Strategies (RTP/SCS), the AQMP update, and in Congestion Management Programs (CMPs) prepared by individual counties within the Southern California Region.

The Regional Transportation Model provides a common foundation for transportation planning and decision-making by SCAG and other agencies within the Region. The Year 2012 base year travel data contained in this report will be referenced by, and of interest to, the general public, as well as local, State, and federal agencies involved in transportation planning and traffic engineering. A number of State, sub-regional, and local agencies in the SCAG Region also perform travel demand model forecasting for their own transportation planning and engineering purposes. These modeling programs require a high degree of coordination and cooperation with SCAG's regional modeling program.

State agencies involved in travel forecasting include the California Department of Transportation (Caltrans) Districts 7, 8, 11, and 12. Sub-regional agencies include the Los Angeles County Metropolitan Transportation Authority (LA Metro), the Orange County Transportation Authority (OCTA), the Riverside County Transportation Commission (RCTC), San Bernardino Associated Governments (SANBAG), the Ventura County Transportation Commission (VCTC), the Imperial County Transportation Commission (ICTC), the County of Orange Environmental Management Agency, and other regional and local transportation agencies. Local agencies, including cities and counties within the Region, also maintain transportation modeling programs. Several of these agencies have contributed directly to preparation of SCAG's Year 2012 Model Validation.

This report summarizes the enhancement, calibration, and validation of the SCAG Regional Transportation Model to the new 2012 base year. This model update was performed in preparation for the development and evaluation of the SCAG 2016-2040 (RTP/SCS). The model is capable of evaluating a wide variety of projects and transportation policies, including the addition of highway pricing strategies, expansion of existing transit services, introduction of new types of transportation services (such as bus rapid transit and high speed rail), and land use policies. As part of the 2012 model update, various submodels were re-estimated and re-calibrated using information from the 2012 California Household Travel Survey (CHTS). This update also enhanced the model sensitivities required to evaluate the land use and transportation policy scenarios that are envisioned by California's greenhouse gas (GHG)

emission reduction legislation, Senate Bill (SB) 375, and meets the requirements and recommendations in the California Transportation Commission's 2010 RTP Guidelines.

The 2012 model exhibits several important features:

- Comprehensive calibration and validation to 2012 travel conditions
- Trip market strata defined by car sufficiency and household income groups used throughout the entire demand models,
- Re-estimated auto ownership model, sensitive to transit and non-motorized accessibility, multi-dwelling family housing, and residential and employment mixed use densities,
- Added auto ownership sensitivity in the destination choice and mode choice models,
- Updated trip production cross-classification models,
- Re-estimated destination choice model
- Re-calibrated nested mode choice model,
- Multi-tiered zone system, consisting of approximately 11,267 zones used thru mode choice, and 4,109 zones used for time-of-day and assignment,
- Addition of a binary toll/no toll choice model to the mode choice model,
- Enhanced sensitivity to housing and employment density, mixed land use development, and accessibility to destinations by transit and non-motorized travel in trip distribution and mode choice models, and
- Ability to forecast intra-regional high-speed rail ridership,
- A High Occupancy Vehicle (HOV) diversion model applied prior to highway assignment to split carpool trips between vehicles that use the HOV lanes and vehicles that remain on the general purpose flow lanes,
- Updated Heavy-Duty Truck (HDT) model, and
- Refinement of congestion and pricing components in the model.

The Year 2012 model results have been compared to independent sources of travel data within the Region, such as auto and truck traffic counts, transit boarding counts, Vehicle Miles of Travel (VMT) from Highway Performance Monitoring System (HPMS), speed data from Freeway Performance Measurement System (PeMS), and other travel survey data. The Regional Transportation Model sufficiently replicates the observed validation data as described herein. As such, the model is validated for use in preparing travel forecasts for the SCAG 2016-2040 RTP/SCS.

Chapter 1 – Overview

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Chapter 1 – Overview

Introduction

SCAG has evolved over the past four decades into the largest of nearly 700 councils of government in the United States. SCAG functions as the Metropolitan Planning Organization for six counties: Los Angeles, Orange, San Bernardino, Riverside, Ventura, and Imperial. The region encompasses a population exceeding 18 million persons in an area of more than 38,000 square miles.

SCAG is the primary agency responsible for the development and maintenance of travel demand forecasting models for the SCAG region. SCAG has been developing and improving these travel demand forecasting models since 1967. SCAG applies the models to provide state of the practice quantitative analysis for the RTP/SCS, the FTIP, and AQMPs. The Regional Model is also used to evaluate other transportation proposals within the region. The model is based on Caliper Corporation's TransCAD modeling software.

This Validation Summary Report combines information from several documents and other sources related to the enhancement and validation of the 2012 Regional Travel Demand Model (Regional Model) for Southern California. The Regional Model is managed and operated by the SCAG with development assistance from private consulting firms and academic institutions. The model is one of several tools used by SCAG to forecast land use and travel demand. Expert panels have overseen the development/enhancement of the SCAG land use and travel demand modeling tools. A Peer Review panel was assembled to review the last major update to the model structure. The panel's recommendations are reflected in the 2012 Regional Model.

Transportation Model Overview

SCAG develops and maintains state-of-the-art transportation models to support SCAG's planning program. These models include:

Trip Based Model	• **2016 RTP/SCS**
Activity Based Model	• **2020 RTP/SCS**
Sub-regional Model Tool	• **Modeling Tools for Locals**
Heavy-Duty Truck Model	• **Truck and Goods Movements**
Air Quality Models	• **Conformity/GHG Determination**

These models are applied by SCAG to forecast transportation conditions and resulting air quality.

Trip-Based Model (Existing Travel Demand Model)

The Regional Travel Demand Model provides travel forecasting capabilities for the analysis of SCAG's plans and programs. The trip-based model was Peer Reviewed in May 2011 and found consistent with the state-of-the-practice. This report describes the various component of the Trip-Based Model, Heavy-Duty Truck Model, and the results of the Year 2012 model validation.

Activity-Based Model

The Activity-Based Model (ABM) is a new generation of travel demand model. The ABM simulates daily activities and travel patterns of all individuals in the region, as affected by transportation system level of service. This new modeling system is designed to meet or exceed federal regulations and state laws/requirements. The ABM Model is in the late stages of development/testing and is expected to be the primary transportation model used in the development of the Year 2020 RTP/SCS.

Subregional Model Tool

The new Subregional Modeling Development Tool (SMDT) greatly simplifies the creation of subregional models. The SMDT fully automates the development of all aspects of a subregional model. The SMDT is used by transportation commissions, counties, subregions, and cities wishing to create subregional models based on SCAG's new Regional Model. The Tool promotes model consistency between the Region's various model agencies and greatly reduces the cost and effort required to create subregional models.

Heavy-Duty Truck Model

Southern California Association of Governments developed the Heavy Duty Truck (HDT) model to evaluate important policy choices and investment decisions. The HDT model is a primary analysis tool to support the goods movement policy decisions made by SCAG and regional stakeholders.

Air Quality Model

EMFAC is an emission factors model developed by the Air Resources Board (ARB) for calculating emission inventories for vehicles in California. This is the emission model approved by the Environmental Protection Agency (EPA) for calculating vehicle emissions for conformity purposes in California.

Focus of Validation Summary Report

The focus of the Validation Summary Report is limited to the existing trip-based model and the Heavy Duty Truck Model.

California SB 375

One of the key factors behind the current model update is California's SB 375 that requires metropolitan areas, such as the SCAG region, to meet regional GHG emission reduction targets for 2020 and 2035. The requirements of SB 375 and the model's implementation and function in this regard were key topics for the May 2011 Peer Review.

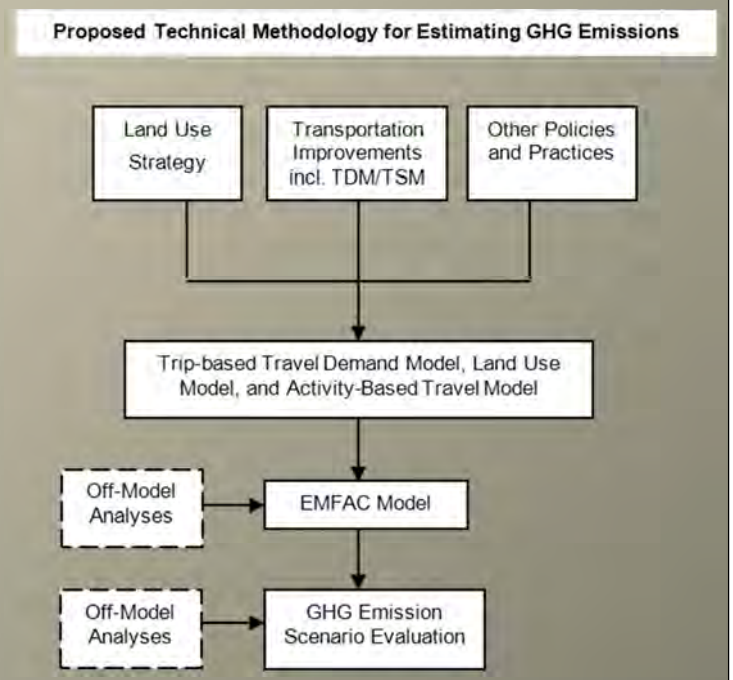
California Senate Bill 375 and Sustainable Communities Strategies

SB 375 became law in California effective January 1, 2009. This law requires California's Air Resources Board (ARB) to develop regional greenhouse gas emission reduction targets for passenger vehicles for 2020 and 2035 for each region covered by one of the State's 18 MPOs, including SCAG. SB 375 was adopted as an "implementation mechanism" for California's Assembly Bill (AB) 32, the Global Warming Solutions Act, which requires 2020 greenhouse gas emissions statewide to be no higher than 1990 levels.

Each Metropolitan Planning Organization (MPO) is required to develop a Sustainable Communities Strategy that demonstrates how the region will meet the greenhouse emission reductions specified by the ARB targets through an integrated process that combines land use, housing, and transportation planning. The SCS becomes part of the Regional Transportation Plan.

SCAG's SCS scenarios comprise seven elements of strategies:

- Land Use and Growth
- Highways and Arterials
- Transit
- Travel Demand Management
- Non-Motorized Transportation System
- Transportation System Management
- Pricing



ARB's website for SB 375 is located at:
www.arb.ca.gov/cc/SB 375/SB 375.htm

Note: TDM - Transportation Demand Management, TSM - Transportation System Management.

Technical Approach of the Validation Process

Model validation is defined as the process by which base year model results are compared to actual, observed travel pattern data such as traffic counts and transit ridership data. SCAG performs a validation of its transportation model for each planning cycle for the Southern California region. A planning cycle is typically four years, corresponding to the update of the RTP/SCS. The "base year" for the current planning period and model is 2012; and 2040 is the forecast year.

Model validation is a regular and essential modeling process that supports the development of the RTP/SCS, FTIP, and AQMPs. In the past, SCAG has prepared a model validation report for each of the previous planning cycle model base years: 1980, 1984, 1987, 1990, 1994, 1997, 2000, 2003 and 2008. The base year of 2012 in the current model replaces the previous base year of 2008.

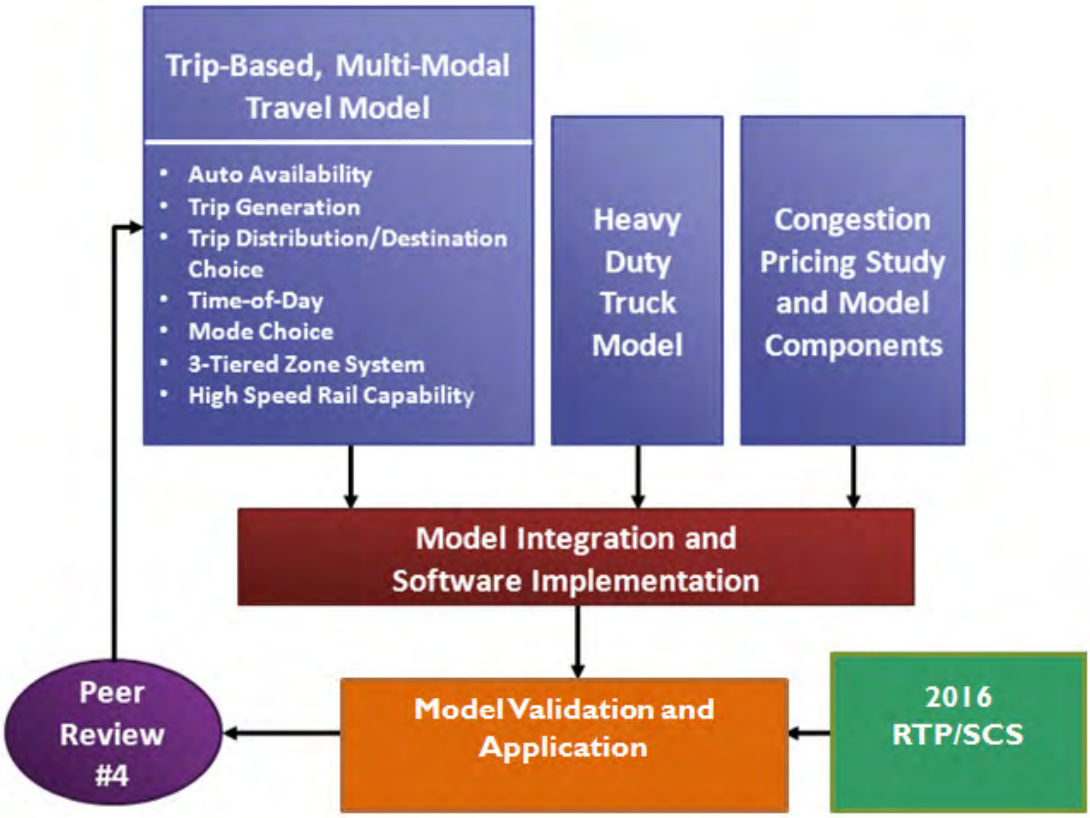
Overview of Model Enhancements

SCAG updated the Regional Travel Demand Model for use in the 2016 RTP/SCS analysis, including calibration of the various components based on the 2012 California Household Travel Survey and a detailed model validation to replicate existing travel conditions. In addition, SCAG implemented a model improvement program, shown in Figure 1-1, to further enhance the model's performance. Specific improvements to update the SCAG model to the 2012 base year and to enhance the model's operation and performance include:

1. Refinement of model features introduced in the 2008 Model:
    a. Trip market strata defined by car sufficiency and household income groups;
    b. Updated auto ownership model, sensitive to transit and non-motorized accessibility, multi-dwelling family housing, and residential and employment mixed use densities;
    c. Added auto ownership sensitivity in the destination choice and mode choice models;
    d. Updated HBW trip production cross-classification model;
    e. Destination choice model, replacing the previous gravity models for all purposes except home-based college and school trips;
    f. Re-designed and re-calibrated mode choice model;
    g. Multi-tiered zone system, consisting of approximately 11,267 zones used through mode choice, and 4,109 zones used for time-of-day choice and assignment;
    h. Addition of a binary toll/no toll choice model to the mode choice model;
    i. Enhanced sensitivity to housing and employment density, mixed land use development, and accessibility to destinations by transit and non-motorized travel in trip distribution and mode choice models;
    j. Ability to forecast intra-regional high-speed rail ridership and its impact on the region's other transit systems;
    k. An HOV diversion model applied prior to highway assignment to split carpool trips between vehicles that use the HOV lanes and vehicles that remain on the general purpose flow lanes;
    l. Updates to the Heavy-Duty Truck Model; and
    m. Refinement of congestion pricing components in the model.

2. Model enhancements performed specifically for the 2012 Model include:
    a. Recalibration of the entire model to targets developed based on the 2012 California Household Travel Survey and 2011 transit on-board survey and ridership data.
    b. Updates to the vehicle ownership model,
    c. Re-estimation of trip production rates
    d. Recalibration of the trip distribution and mode choice model,
    e. Upgrades to the heavy-duty truck model,
    f. Updates to the highway and transit networks,
    g. Enhancement of sensitivity to potential SCS strategies such as pricing and transit-oriented development strategies.
    h. All of the Model's basic trip-making characteristics were updated based on the 2012 California Household Travel Survey
    i. Price based variables were updated to represent 2011 dollars, and
    j. A comprehensive model validation was performed to ensure the Model properly replicates base-year (2012) travel conditions

Figure 1-1: SCAG Regional Transportation Demand Model Enhancement Program



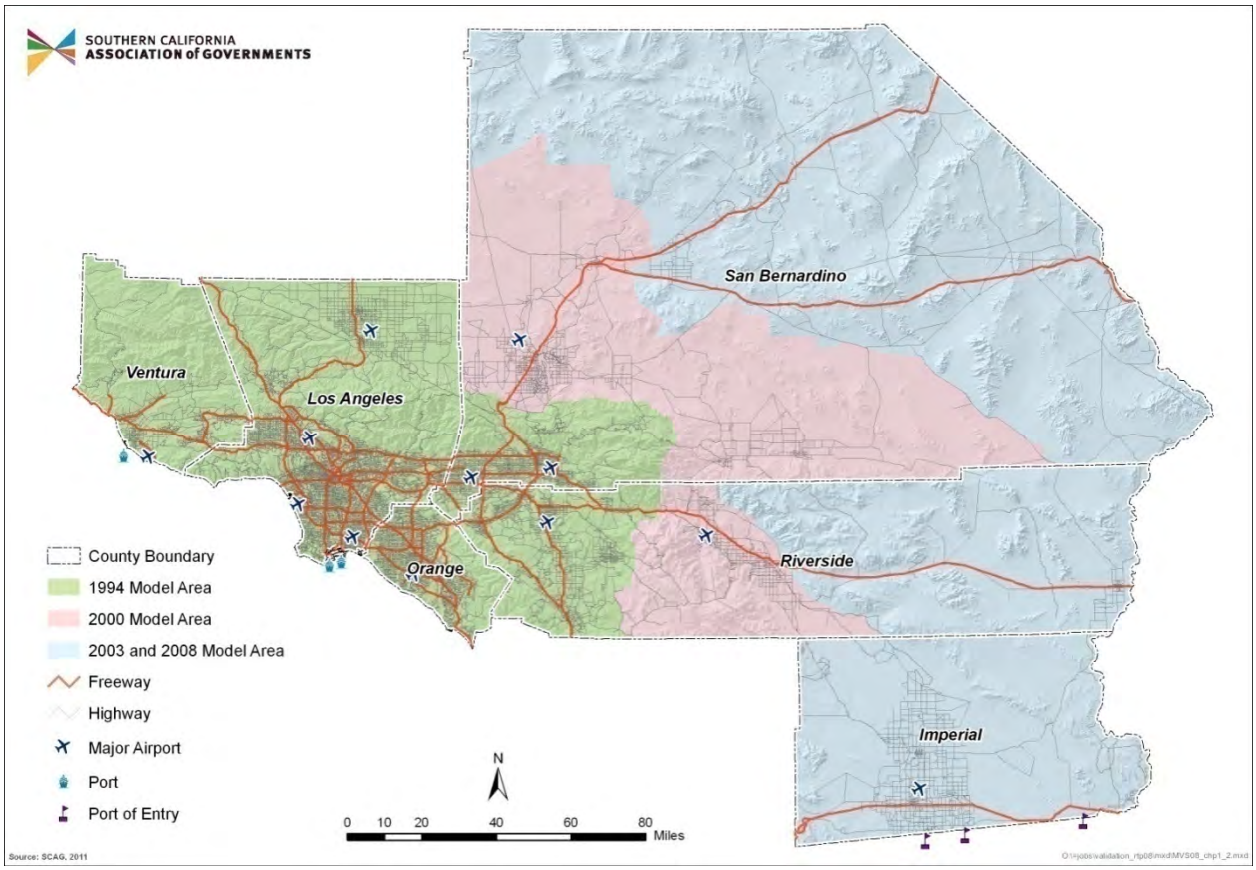
Modeling Area

The modeling area of the SCAG 2012 Regional Travel Demand Model is same as the modeling area of 2008 Model and covers the following six counties in their entirety:

- Imperial County,
- Los Angeles County,
- Orange County,
- Riverside County,
- San Bernardino County, and
- Ventura County.

Figure 1-2 shows the Modeling Area. The figure also indicates how the modeling area has expanded over time.

Figure 1-2: Modeling Area



Zone System

Socioeconomic data and other information for the model are contained in geographically defined areas known as Transportation Analysis Zones (TAZ). The TAZs are attached to the networks using centroid connectors that allow travelers (trips) to access to the transportation system by simulating local and neighborhood streets. They provide the spatial unit (or geographical area) within which travel behavior and traffic generation are estimated. TAZs are ideally, but not always, sized and shaped to provide a relatively homogeneous amount and type of activity.

The SCAG model uses a tiered zone system structure as shown in Figure 2-2 that allows for micro (i.e., neighborhood) and macro-scale (i.e., regional) analysis and reporting.

In order to more accurately model detailed travel movements throughout the region for the base and horizon years, the TAZ structure has been modified to enhance the precision of micro-level land use and smart growth analysis for the RTP/SCS. In addition, The Model contains 40 external stations to facilitate modeling of trips to, from, and through the region. The TAZ modification process involved extensive coordination with sub regional modeling agencies throughout the region. The Regional Model includes two tiers of TAZ. The first tier contains 4,109 internal zones, while the second tier contains

11,267 internal zones. All Tier 2 zones nest within Tier 1 zones. Table 1-1 and Figure 1-3 provide statistical information and a graphical display of the zone structure.

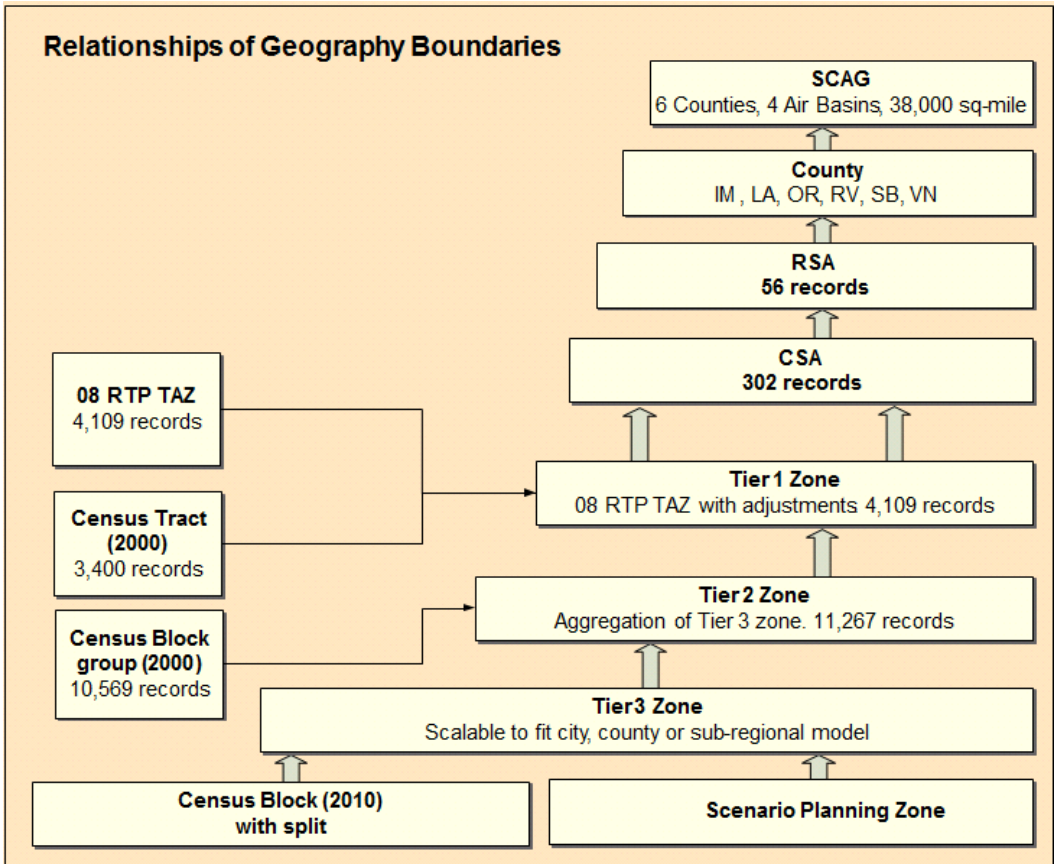
Table 1-1: Summary of different geographic zones

Modeling Area	2010 Census Tract	2010 Census Block Group	RSA *	CSA**	Tier 1 TAZ (Internal)	Tier 2 TAZ (Internal)
Imperial County	31	96	1	15	110	239
Los Angeles County	2,346	6,425	21	155	2,243	5,697
Orange County	583	1,823	10	43	666	1,741
Riverside County	453	1,030	11	38	478	1,532
San Bernardino County	369	1,092	7	34	402	1,395
Ventura County	174	430	6	17	210	663
Total	**3,956**	**10,896**	**56**	**302**	**4,109**	**11,267**

**RSA – Regional Statistical Area*

***CSA - Community Statistical Area*

Figure 1-3: Structure of the Tiered Zone System in the SCAG Model



Methodology

A tiered TAZ system was jointly developed by SCAG and its member agencies, based on sub-regional TAZs and SCAG MPUs (Minimum Planning Units). The 2016 RTP/SCS MPUs were built based on 2010 Census Block data with some splits added according to major road, natural and artificial barriers, satellite photo, land use, and local inputs. The TAZ Tier 1 is an aggregation of TAZ Tier 2 zones, which matches the total number and general geography of the previous Regional TAZs.

The following provides a description of the principles that guided the development of the new Regional TAZ System. These principles follow standard modeling practice.

- ***Consistency with 2009 TIGER/Line Tract Boundaries*** – Both tiers of the Regional TAZs are consistent with Census 2009 Topographically Integrated Geographic Encoding and Referencing (TIGER)/Line Tract boundaries. Regional TAZs are either entire census tracts or are wholly contained within a census tract. Some exceptions occur where census tracts consist of multi-part polygons or local inputs provide better boundaries.

- ***Consistency with 2009 TIGER/Line Block Group or Sub-regional TAZ Boundaries*** – To sensure the consistency, our TAZ boundary is maintained the same as the SCAG 2008 Model development.

- ***Consistency between the Two Tiers of the Regional TAZ System*** – The Tier 2 zones of the Regional Model's TAZ system are consistent with the Tier 1 zones. Tier 2 zones consist either of an entire Tier 1 zone or are wholly contained within a Tier 1 zone.

- ***Consistency with 2009 TIGER/Line Block Boundaries*** –To ease data collection and creation, zonal boundaries generally do not cross Census 2000 Blocks (updated boundary in 2009). Some exceptions occur where Census Blocks consist of multi-part polygons or local inputs provide better boundaries.

- ***Complement the Transportation System*** – A critical step in developing the TAZ system is defining the level of roadway facilities for which accurate forecasts are desired. To ensure an accurate distribution and traffic assignments, existing and future freeways and principal arterials are generally represented as regional TAZ boundaries, consistent with other zonal creation criteria.

- ***Homogeneous Land Use*** – Land use maps and general plan maps were used to identify existing and future land use. Ideally, it is best to limit the number of different land uses contained within a zone. However, given the geographic size of the regional TAZs and the mixed-use development patterns within the urban area, creating zones with uniform land uses was often difficult.

- ***Similar Population/Employment Size*** – Zones were developed to represent similar levels of future development (population and employment). This parameter was not strictly enforced given the sparse development of some areas, the intensity of nonresidential land uses within urban areas, and consideration for special generators (example - universities and airports).

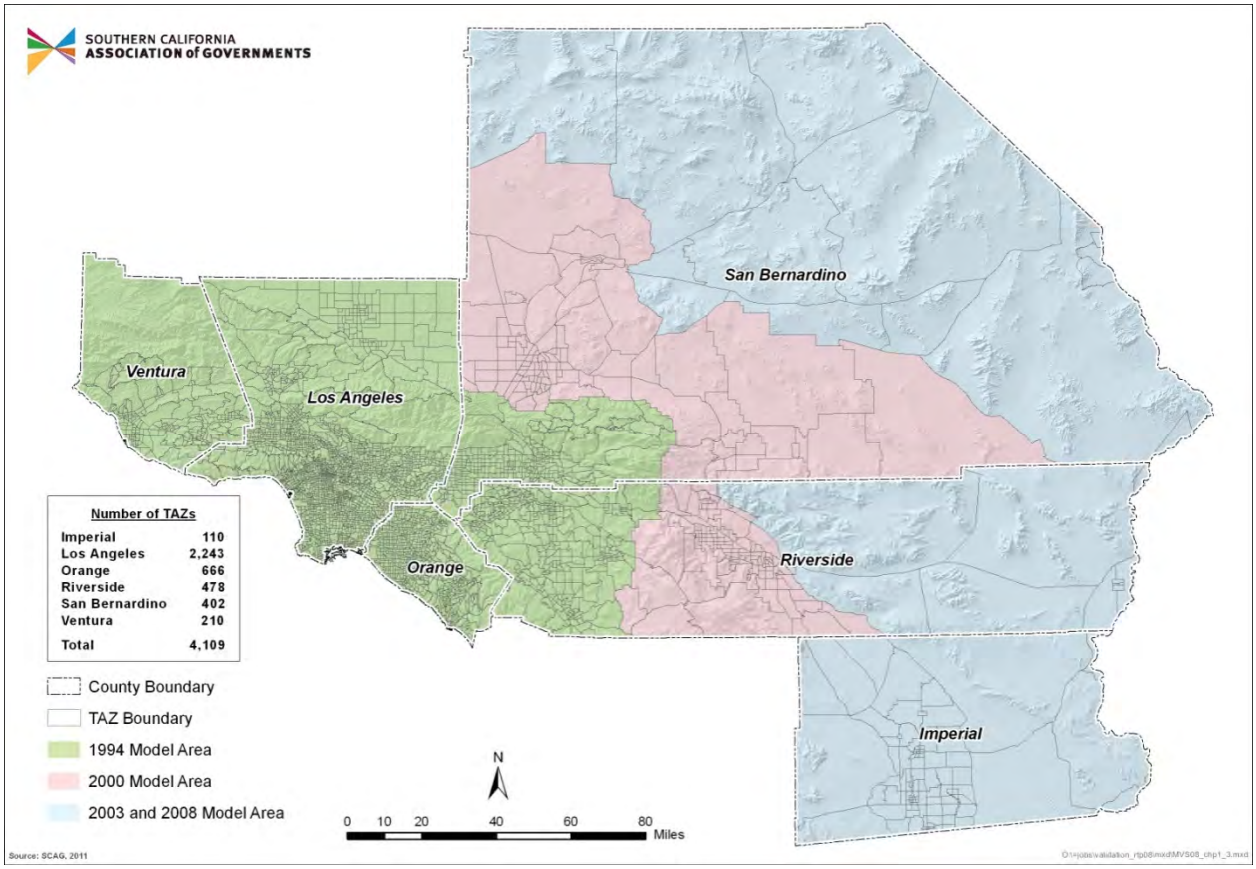
- ***Other Considerations*** – Natural and man-made boundaries are also considered in the definition of the zone system. Political jurisdictions, railroad lines, rivers, mountain ranges and other topographical barriers were considered in developing the two tiers of regional TAZs.

Procedures

Tier 2 zones originated from the 2009 TIGER/Line block group and sub-regional TAZ boundary files. ESRI ArcGIS was used to overlay these original maps with the existing TAZs, the highway network, land use maps, and satellite images. Then, the principles described above were applied. Where a Tier 2 zone needed to be subdivided, the 2009 TIGER/Line boundaries were followed. A tool, TAZDK, was developed in ArcGIS to assist data processing and quality control. Several analyses were undertaken to ensure that all Tier 2 zones were reasonable and that the entire SCAG area was covered by the new zones without slivers or overlaps. An additional step was incorporated in the development of the 2012 zone system to adjust TAZ boundaries to be consistent with the new Scenario Plan Zones (SPZ).

Once a clean Tier 2 TAZ map was created, the final Tier 2 zones were aggregated into 4,109 Tier 1 zones based on the pattern of the previous regional TAZs. Before finalizing the new regional TAZ system, automatic and manual examinations were conducted to ensure consistency with the above principles. The draft and final zone systems were shared with sub regional modeling agencies for their review and concurrence. Figure 1-4 shows the Tier 1 TAZs.

Figure 1-4: Transportation Analysis Zone System (Tier 1)



Overview of the Peer Review Process

A robust peer review process is an important component of the SCAG model development program. SCAG's 2012 Model uses the same model framework as the previous 2008 Model, which was developed using a comprehensive peer review. SCAG's peer review process has involved two levels of review and comment:

1) ***Expert Panels*** – SCAG assembled panels of experts for each of the major model improvement projects to provide review and guidance; and

2) ***Peer Review*** – Academic, MPO, Federal and other modeling experts to review SCAG's overall modeling program and modeling results to determine if they are satisfactory to support regional transportation planning analysis.

A series of four Peer Review panels were convened by SCAG for regional travel model validations. Panels were convened in January 2002 for the 1997 base year model; in November 2003 for the 2000 base year model; in January 2006 for the 2003 base year model; and in June 2011 for the 2008 base year model.

In 2002, SCAG initiated an effort to use new data to update and recalibrate its travel demand model. In January of that year, the first Peer Review of SCAG's model was conducted. At that time, the panel concluded that SCAG's model was at the leading edge of the state of the practice. The panel recommended several changes, including adding trip purpose, creating a vehicle availability model, and modifying the mode choice model. SCAG has implemented many of these recommendations.

The second Peer Review was held in November 2003. Topics reviewed during this meeting included validation targets, the revised vehicle availability model, trip generation, external trips, and the selection of variables for the mode choice model. At this same time, Cambridge Systematics was awarded a contract to address these concerns and update the travel demand model.

The third Peer Review in January 2006 focused on the previously updated model components, especially trip distribution, mode choice, and trip assignment. The panel determined that SCAG had developed a "state-of-the-practice" model. The panel highlighted several strengths, including the freight model, the strategic work trips, and the use of four time periods in assignment. The panel felt that SCAG had done a particularly good job with data collection, and that the planned speed study was a good next step.

The fourth Peer Review was held in June 2011. SCAG's 2008 Regional Travel Model Peer Review Panel was comprised of nationally-recognized experts in the fields of travel demand modeling and data collection and analysis. The panel members are shown in Table 1-2. The Peer Review Panel recommended several short-term considerations, including: addressing auto ownership sensitivity in the trip distribution and mode choice models; sensitivity testing to longer travel by medium and high density areas; traffic count averaging; heavy duty truck model validation; validation of speeds and travel times; and adding demographic profiles and maps to the validation report.

The 2012 validation utilizes the same Trip-Based Model previously peer reviewed in June 2011. The Peer Review Panel at that time found that the "SCAG travel demand model is an advanced 4-step model that meets and in many cases exceeds the state of the practice … the model is suitable for use in preparing the 2012 RTP, conformity analysis, and SCS". The current 2012 Model uses the same model structure and framework as the previous peer reviewed model, but has been updated to replicate

current travel conditions. The update included utilizing up-to-date model input data, recalibration using new travel survey data, and validation using 2012 traffic data

Table 1-2: 2011 Regional Travel Model Peer Review Panel #4 (June 27-28, 2011)

Name	Organization
Guy Rousseau (Chair)	Atlanta Regional Commission
Chaushie Chu, Ph.D.	Los Angeles County Metropolitan Transportation Authority (LACMTA)
Chris Forinash	U.S. Environmental Protection Agency (EPA)
David Levinson, Ph.D.	University of Minnesota
David Ory, Ph.D.	Metropolitan Transportation Commission (MTC)
Eric Pihl	Federal Highway Administration (FHWA)
Kara M. Kockelman, P.E., Ph.D.	University of Texas, Austin; Expert Panel – Congestion Pricing
Ken Cervenka	Federal Transit Administration (FTA)
Mark Bradley	Mark Bradley Research and Consulting

Overview of Report

The input data, model enhancements, calibration, validation, and results of each of the modeling components of the SCAG 2012 Regional Model are summarized in the respective chapters:

- Chapter 1 – Overview
- Chapter 2 – Socioeconomic Input Data
- Chapter 3 – Trip Generation
- Chapter 4 – Transportation Networks
- Chapter 5 – Trip Distribution
- Chapter 6 – Mode Choice
- Chapter 7 – Heavy Duty Truck Model
- Chapter 8 – Time of Day Model
- Chapter 9 – Trip Assignment

Supplemental information is contained in the following appendices:

- Appendix A - Highway Network Coding Conventions
- Appendix B – Auto Operating Costs
- Appendix C – SCAG's Model Peer Review

SOUTHERN CALIFORNIA ASSOCIATION of GOVERNMENTS

Chapter 2 - Socioeconomic Input Data

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CHAPTER 2 – SOCIOECONOMIC INPUT DATA

Introduction

Socioeconomic data, which describes both demographic and economic characteristics of the region by TAZ, is used as major input to SCAG's travel demand model. Travel demand analysis is based on the concept that travel is a derived demand of activity participation. Zonal demographic data, such as population, households, and income, is directly related to demand for activity participation of the area; economic characteristics, such as jobs by industry, are linked with supply of an activity.

The socio-economic input data for year 2012 consists of various marginal and joint distributions of population and households for each TAZ. A total of 65 socio-economic variables and 8 joint distributions of two or more variables are developed as model inputs (see Tables 2-1 and 2-2). Those variables include population, households, school enrollments, household income, workers, and employment, etc. These variables are available for 4,109 Tier 1 TAZs and 11,267 Tier 2 TAZs, respectively.

The marginal and joint distributions of socio-economic variables were developed by SCAG forecasting staff using diverse public and private sources of data and advanced estimation methods. The major data sources include 2000 and 2010 Census, American Community Survey (ACS), California Department of Finance (DOF), California Employment Development Department (EDD), firm based InfoGroup data, 2012 Existing Land Use and County Assessor's Parcel Database.

The socio-economic input data at the TAZ level is estimated using three major processes: 1) development of three major variables (population, households, employment); 2) development of secondary variables (attributes of three major variables and workers); 3) development of joint distributions of population/households/workers by selected attributes.

Development of Three Major Variables

SCAG started the TAZ level socioeconomic input to the transportation model by estimating Population, Household, and Employment first.

Table 2-1: Description of Socio-Economic Variables

1.	**Population (8 variables)**
1.1.	Total Population: total number of people living within a zone. Total population is composed of residential population and group quarters population.
1.2.	Group Quarters (Non-Institutional) Population: is primarily comprised of students residing in dormitories, military personnel living in barracks, and individuals staying in homeless shelters. Group quarters (non-institutional) population does NOT include persons residing in institutions.
1.3.	Residential Population: the number of residents NOT living in "group quarters."
1.4.	Group Quarters Population living in student dormitories: Population living in college dormitories (includes college quarters off campus).
1.5.	Population by Age (4 variables): the number of population for different age groups: 5-17, 18-24, 16-64, and 65+.
2.	**Households (26 variables)**
2.1.	Total Households: Household refers to all of the people who occupy a housing unit. By definition there is only one household in an occupied housing unit.
2.2.	Households by Household Size (4 variables): the number of one-person households, two-person households, three-person households, and four or more person households.
2.3.	Households by Age of Householder (4 variables): the number of households with age of householder between 18 and 24 years old, 25 and 44, 45 and 64, and 65 or older.
2.4.	Households by Number of Workers (4 variables): the number of households with no worker, with one worker, with two workers, and with three workers or more.
2.5.	Households by Household Income (4 variables): the number of households with annual household income (in 2011 dollars) of less than $34,999, $35,000-$74,999, $75,000-$149,999, and $150,000 or more.
2.6.	Households by Type of Dwelling Unit (2 variables): the number of households living in single-family detached housing, and living in other housing.
2.7.	Households by Number of College Students (3 variables): the number of households with no college student, with one college student, with two college students or more.
2.8.	Households by Number of Children age 5-17 (4 variables): the number of households with no child, with one child, with two children, and three children or more.
3.	**School Enrollment (2 variables)**
3.1.	K-12 School Enrollment: the total number of kindergarten through 12th grade (K-12) students enrolled in all public and private schools located within a zone. All elementary, middle (junior high), and high school students are included. This variable represents "students by place of attendance."
3.2.	College/University Enrollment: the total number of students enrolled in any public or private post-secondary school (college or university) that grant an associate degree or higher, located within a zone. This variable also represents "students by place of attendance."
4.	**Workers (4 variables)**
4.1.	Total Workers: total number of civilian workers residing in a zone. Workers are estimated by the place of residence.
4.2.	Workers by earning level (3 variables): the number of workers with earnings of less than $34,999, $35,000-$74,999, $75,000 or more.
5.	**Median Household Income (5 variables)**
5.1.	Median Household Income: Median Household Income is the median value of household income for all households within a zone. Household Income includes the income, from all sources, for all persons aged 15 years or older within a household.
5.2.	Median Household Income by Income Categories (4 variables): The median income is estimated for each of four different income categories: less than $34,999, $35,000-$74,999, $75,000-$149,999, and $150,000.

6.	**Employment (17 variables)**
6.1.	The employment variables represent all jobs located within a zone (i.e., employment by place of work). Jobs are composed of wage and salary jobs and self-employed jobs. Jobs are categorized into 13 sectors based on North American Industry Classification System (NAICS) code definition.
6.2.	Total Employment: total number of jobs within a zone.
6.3.	Employment by 13 Industries: the number of total jobs for 1) agriculture & mining, 2) construction, 3) manufacturing, 4) wholesale trade, 5) retail trade, 6) transportation, warehousing, and utility, 7) information, 8) financial activities, 9) professional and business services, 10) education and health services, 11) leisure and hospitality services, 12) other services, and 13) public administration.
6.4.	Employment by wage level (3 variables): total number of jobs by three wage levels: of less than $34,999, $35,000-$74,999, $75,000 or more.
6.5.	Warehouse employment 1). light/general warehouse area in square feet, 2). High cube warehouse areas in suare feet, 3) light/general warehouse emp 4)High cube warehouse EMP.

Table 2-2: Joint Distributions of Population/Households/Workers by Selected Attributes

1.	**Joint distribution of households by**
1.1.	Household income (less than $34,999, $35,000-$74,999, $75,000-$149,999, and $150,000+),
1.2.	Household size (1,2,3,4+ persons in household),
1.3.	Number of workers (0,1,2,3+ workers in household),
1.4.	Type of dwelling unit (single-family detached, other)
2.	**Joint distribution of households by**
2.1.	Household income (less than $34,999, $35,000-$74,999, $75,000-$149,999, and $150,000+)
2.2.	Number of workers (0,1,2,3+ workers in household),
2.3.	Age of head of household (18-24, 25-44, 45-64, 65+ years old)
3.	**Joint distribution of households by**
3.1.	Household income (less than $34,999, $35,000-$74,999, $75,000-$149,999, and $150,000+)
3.2.	Household size (1,2,3,4+ persons in household)
4.	**Joint distribution of households by**
4.1.	Number of college students (0, 1, 2+),
4.2.	Household income (less than $34,999, $35,000-$74,999, $75,000-$149,999, and $150,000+
5.	**Joint distribution of households by**
5.1.	Number of children age 5-17 (0,1,2,3+),
5.2.	Household income (less than $34,999, $35,000-$74,999, $75,000-$149,999, and $150,000+
6.	**Joint distribution of households by**
6.1.	Household income (less than $34,999, $35,000-$74,999, $75,000-$149,999, and $150,000+),
6.2.	Household size (1,2,3,4+ persons in household),
6.3.	Number of workers (0,1,2,3+ workers in household),
6.4.	Household by age (18-24, 25-44, 45-64, 65+)
7.	**Joint distribution of persons by**
7.1.	Age (0-4, 5-17, 18-24, 25-64, 65+)
7.2.	Household income (less than $34,999, $35,000-$74,999, $75,000-$149,999, and $150,000+

8. Joint distribution of workers by
8.1. Worker's earnings (less than $34,999, $35,000-$74,999, $75,000+)
8.2. Household income (less than $34,999, $35,000-$74,999, $75,000-$149,999, and $150,000+)

The initial TAZ level household and employment estimates started at the Minimum Planning Unit (MPU) level within the TAZ. The MPU is the smallest geographic computing unit that our calculations take place. In general, the MPUs are equivalent to parcels. 2012 parcel data, the 2010 Census, 2011 firm based employment data, and 2012 EDD (Employment Development Department) data are the key databases used in the development of MPU level 2012 household and employment.

The the new residential construction between 2010 and 2012 to 2010 household estimates from the Census to form the 2012 MPU level household. The 2011 firm based employment served as MPU level data base. It was further controlled and adjusted by referencing the 2012 EDD data.

The aggregation of the MPU level household and employment became the first cut of the TAZ level estimate.Total population is calculated based on the TAZ household estimate. Two components for the total population are group quarter population and residential population. The average number of persons per household is constrained by the updated city PPH. Group quarters population is calculated using the estimates from the 2010 Census and 2012 DOF (Department of Finiance).
TAZ level Population, household and employment are controlled to the 2012 jurisdictional level estimates.

Development of Secondary Variables

Population, Household, and Employment are further broken into necessary attributes (e.g., etc.), as required in the transportation demand model. The additional attribute variables are defined as the secondary variables. These secondary variables at the TAZ level are estimated using the Small Area Secondary Variables Allocation Model (SASVAM). SASVAM is generally based on the probabilistic choice model reflecting the temporal change of the individual attribute and the changing relationship of the related attributes.

Development of Joint Distributions of Population / Households / Workers by Selected Attributes

The joint distributions of household are developed into 8 joint tables of selected secondary variables using the Population Synthesis (PopSyn) generates synthetic populations and households with attribute distributions, which become the basis for computing the joint distributions. SCAG uses the 2010 Census SF3 (Summary File) and 2007-2011 5-year PUMS (Public Use Microdata Sample) individual data at the PUMA level as seed data to produce synthetic populations and households at the TAZ level.

Socioeconomic Input Data Summary

The selected socioeconomic data inputs to the Year 2012 Model Validation process are presented in the following tables and figures. Table 2-3 presents a summary of socioeconomic data totals by county and

for the SCAG Region. Figures 2-1 to 2-3 show 2012 population density, household income distributions, and employment density for the Tier 2 level TAZs.

Table 2-3: Year 2012 SCAG Model Socioeconomic Input Data

Population and Workers				
County	**Resident Population**	**Group Quarters Population (Non - Institutional)**	**Total Population**	**Resident Workers**
Imperial	170,278	0	179,591	53,158
Los Angeles	9,740,291	52,946	9,918,214	3,950,146
Orange	3,028,089	11,551	3,071,434	1,284,987
Riverside	2,209,860	7,087	2,244,929	774,300
San Bernardino	2,028,505	1,470	2,067,967	704,849
Ventura	824,530	2,493	835,449	347,060
Total	**18,001,553**	**75,547**	**18,317,584**	**7,114,500**

Households						
County	**Below 35k**	**35k - 75k**	**75k-150k**	**150k Over**	**Total Household**	**Household Size**
Imperial	22,404	14,089	10,342	2,592	49,427	3.45
Los Angeles	1,104,724	968,228	807,149	375,324	3,255,425	2.99
Orange	234,141	280,479	308,520	176,221	999,361	3.03
Riverside	230,382	218,895	183,934	61,260	694,471	3.18
San Bernardino	207,278	204,884	159,224	43,989	615,375	3.30
Ventura	62,897	74,749	85,495	46,152	269,293	3.06
Total	**1,861,826**	**1,761,324**	**1,554,664**	**705,538**	**5,883,352**	**3.06**

Employment				
County	**Retail**	**Service**	**Other**	**Total**
Imperial	6,011	27,694	14,143	47,848
Los Angeles	426,529	2,418,217	1,397,831	4,242,577
Orange	142,227	865,203	518,797	1,526,227
Riverside	85,165	351,085	180,437	616,687
San Bernardino	84,038	374,641	200,784	659,463
Ventura	39,267	169,913	123,070	332,250
Total	**783,237**	**4,206,753**	**2,435,062**	**7,425,052**

School Enrollment		
County	**K Thru 12**	**College and University**
Imperial	40,893	10,754
Los Angeles	1,783,534	704,349
Orange	549,465	225,511
Riverside	470,788	129,840
San Bernardino	451,653	133,893
Ventura	158,995	52,031
Total	**3,455,328**	**1,256,378**

Figure 2-1: Population Density (2012)

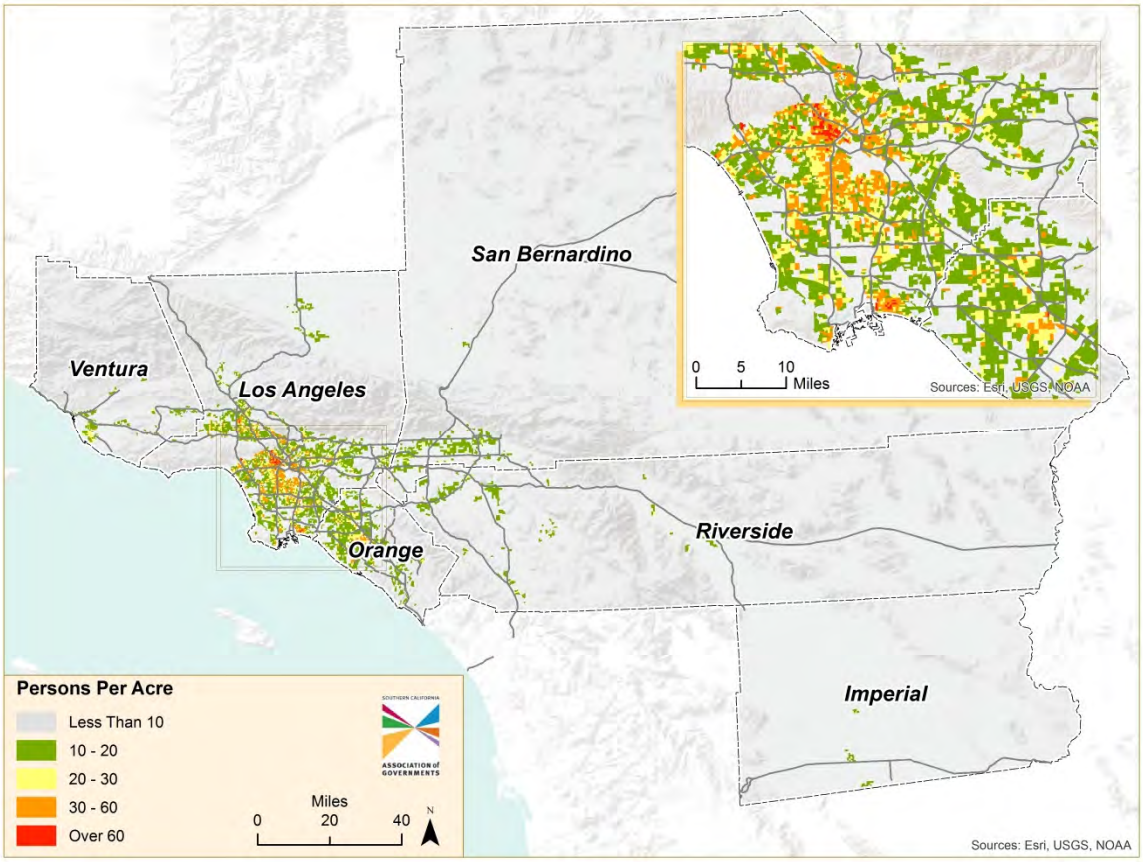


Figure 2-2: Household Income Distributions (2012)

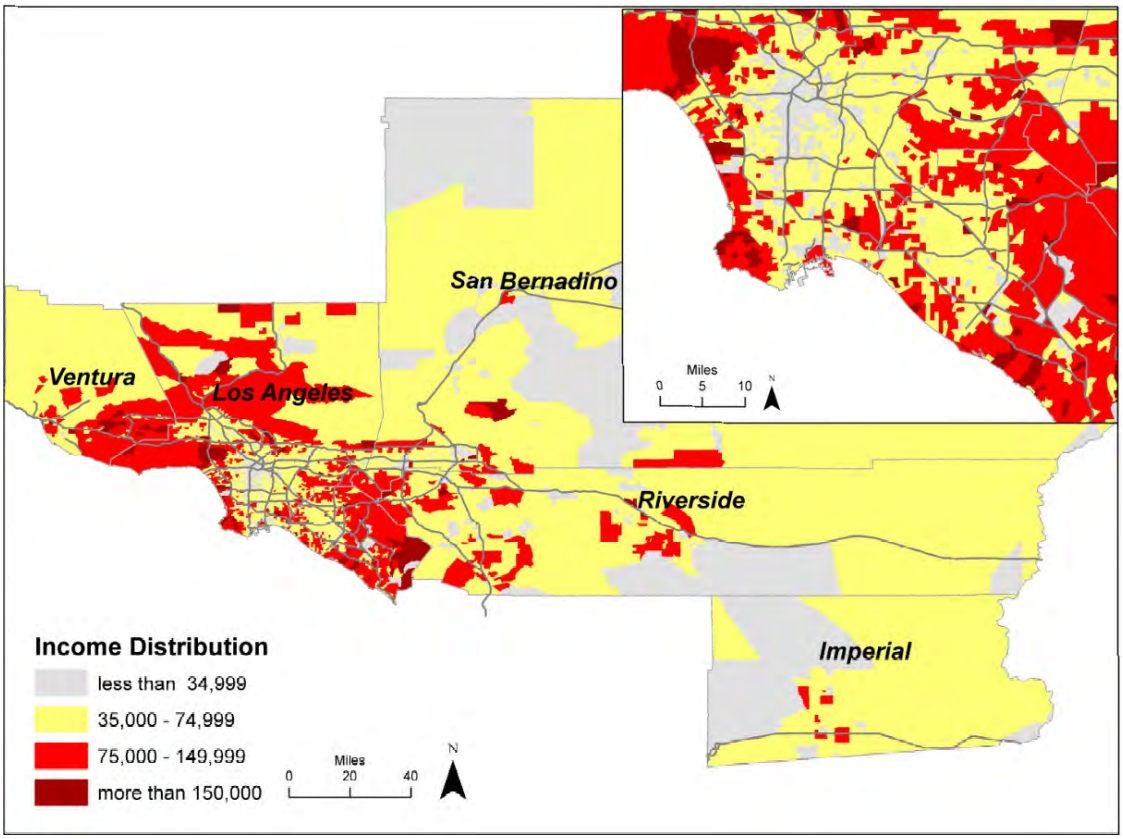
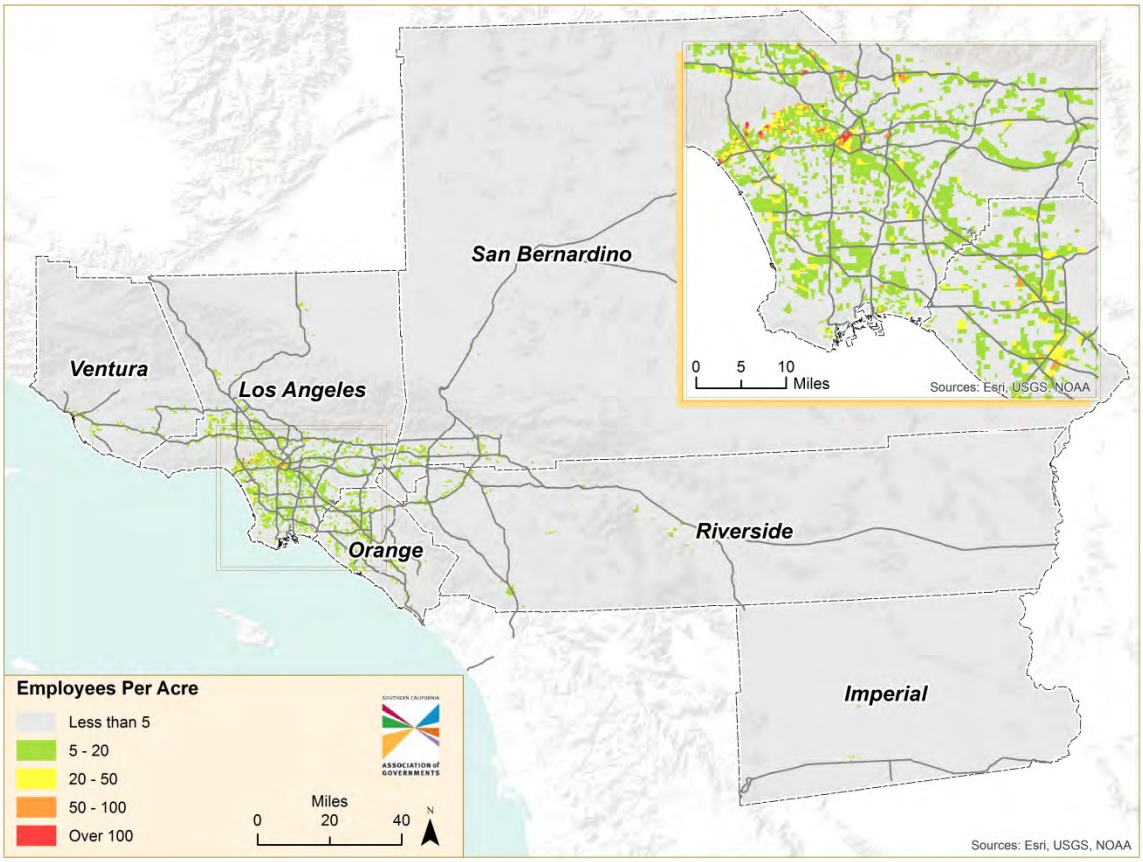


Figure 2-3: Employment Density (2012)



Chapter 3 – Trip Generation

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CHAPTER 3 – TRIP GENERATION

Introduction

Trip generation is the process of estimating daily person trips for an average weekday generated by households within each TAZ. The Year 2012 Model contains a series of models to estimate trip productions and trip attractions by trip type. The trip production models estimate the number of person trips generated in each TAZ, and trip attraction models estimate the number of person trip attracted to each TAZ. Trip generation estimates trip production and attraction at the Tier 2 zonal level. The trip generation component includes an Auto Availability model, which forecasts the number of vehicles available to each household in the region. Auto availability, along with household income, household size, number of workers and other variables are used to forecast trip productions, while trip attractions are a function of land use activity measures such as employment, residential households, and school enrollment.

Trip Purpose

The model uses an expanded set of trip purposes. This was done to improve trip distribution and mode choice estimates, and to more accurately link trip productions and trip attractions. The model contains 10 trip purposes, each subdivided into different household markets. Total trips produced by TAZ were estimated for each of the following trip purposes and household segments:

1. Home-Based Work Direct and 2. Home-Based Work Strategic

There are two types of home-based work trips: "direct" home-based work trips and "strategic" home-based work trips. "Direct" home-based work (HBWD) trips are trips that go directly between home and work, without any intermediate stops. "Strategic" home-based work (HBWS) trips are trips between home and work that include one or more intermediate stops, such as to drop-off or pick-up a passenger, to drop-off or pick-up a child at school, or for other reasons. The trip generation model estimates HBWD and HBWS trips for five household markets, which are carried through trip distribution and mode choice:

- Zero Car Households
- Car Insufficient Households
- Car Sufficient Households, Low Income (less than $35,000)
- Car Sufficient Households, Medium Income ($35,000 to $74,999)
- Car Sufficient Households, High Income ($75,000 or greater)

3. Home-Based School

Home-based school (HBSC) trips include all student trips with an at-home activity at one end of the trip and a Kindergarten through 12th grade school activity at the other end. This purpose does not include trips in the college/university category, which follows.

4. Home-Based College and University

Home-based college and university (HBCU) trips include all trips made by persons over the age of 18 with an at-home activity at one end of a trip and a college or university activity at the other end.

5. Home-Based Shopping

Home-based shopping (HBSH) trips include all person trips made with a home activity at one end of a trip and a shopping activity at the other end. The trip generation model estimates HBSH trips for the same five household markets used for HBW trips. This auto sufficiency / household income segmentation is maintained in trip distribution and mode choice. Auto sufficiency is measured differently for work and non-work trips, as described in Table 3-11 below.

6. Home-Based Social-Recreational

Home-based social-recreational (HBSR) trips include all person trips made with a home activity at one end of a trip and a visiting or recreational activity at the other end. The model estimates HBSR trips for the five household markets used for HBSH trips, maintained through trip distribution and mode choice.

7. Home-Based Serving-Passenger

Home-based serve passenger (HBSP) trips include all person trips made with a home activity at one end of a trip and a passenger serving activity, such as driving someone to somewhere, at the other end. Trips that serve passengers while on the way to work are classified as home based work strategic trips rather than serve passenger trips because they are part of a work trip chain. The model estimates HBSP trips for the five household markets used for HBSH trips, also maintained through trip distribution and mode choice.

8. Home-Based Other

Home-based other (HBO) trips include all other home-based (with a home activity at one end of a trip) trips that are not already accounted for in any of the home-based trips categories described above. The model estimates HBO trips for the five household markets used for HBSH trips, also maintained through trip distribution and mode choice.

9. Work-Based Other

Work-based other (WBO) trips are non-home-based trips where at least one end of a trip is from/to a work location. An example of such a trip would be, "running an errand during lunch hour" from one's place of employment.

10. Other-Based Other

Other-based other (OBO) trips are all other trips that do not begin or end at a trip-maker's home or place of work.

Vehicle Availability Model

Introduction

The auto availability model predicts the number of households with 0, 1, 2, 3, and 4 or more available vehicles. The model was estimated in a multinomial logit form using the ALOGIT software. This model is the first model applied in the model chain. As is customary, the model was estimated using household records, and then applied at the aggregate, TAZ level. The auto availability model includes indicators for

household size, household income, number of workers, type of housing unit, residential and employment density, and transit and non-motorized accessibilities.

Estimation Dataset

Data for this model estimation was obtained from the 2012 California Household Travel Survey and the 2012 SCAG Add-On survey. Combined, these two surveys yielded a final sample of 35,026 usable households.
Table 3-1 shows the number of sample households by auto availability and by the four household attributes included in the estimation file.

Table 3-1: Observed Household Frequencies

	Count	Percent
Auto Availability		
Zero vehicle	1,059	6%
One	5,977	35%
Two	6,745	40%
Three	2,232	13%
Four or more	926	5%
Household Size		
One person	5,108	30%
Two	5,929	35%
Three	2,393	14%
Four or more	3,509	21%
Household Workers		
Zero workers	4,055	24%
One	7,214	43%
Two	4,848	29%
Three or more	822	5%
Household Income		
0 - $35K	3,386	20%
$35K- $75K	4,111	24%
$75K - $150K	5,215	31%
$150K or more	2,166	13%
unknown	2,061	12%
Type of Housing Unit		
Single family detached	10,585	62%
Other	6,354	38%

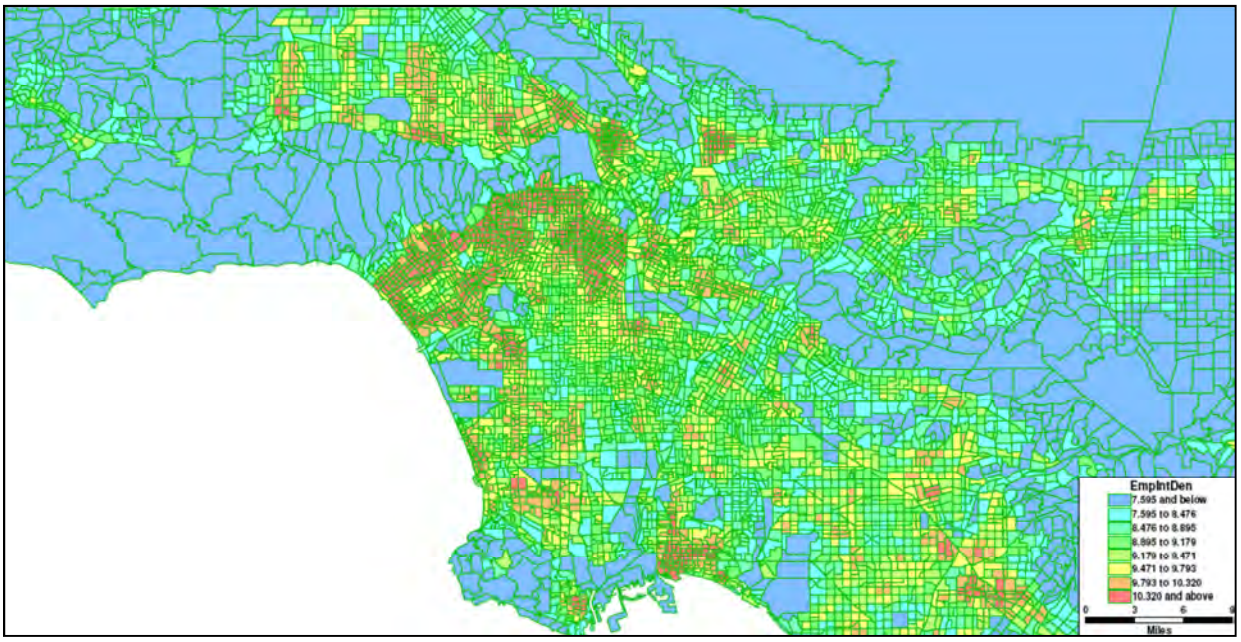
The survey observations were joined with multiple measures of residential density, employment density, and transit and non-motorized accessibility. Table 3-2 shows a complete list and definitions of all the density and accessibility measures examined during model estimation.

Table 3-2: Land Use Form and Accessibility Measures

Measure	Description and Formulas
Density Measures	Density measures are calculated over a 1/2 mile radius of the TAZ centroid. These densities are based on total area, instead of developed area.
Household Density	Total Households / Area
Retail Employment Density	Retail Employment / Area
Total Employment Density	Total Employment / Area
Diversity Measures	The indicators of diversity may be proportional to geometric averages of various land uses. These variables take the highest values when all the uses are high and equally allocated. Diversity can also be expressed as the relative difference between various land uses. The highest diversity occurs when the two land uses are equal, lowest when one or the other dominates. These measures are calculated over a one-half mile radius of the TAZ centroid.
Retail Employment (RE) and Household (HH) Diversity	0.001 x RE x HH / (RE + HH)
Retail/Service Employment (RSE) and Household Diversity	0.001 x RSE x HH / (RSE + HH)
Jobs/Housing diversity (SACOG)	1- [ABS(b*HH - EMP)/(b*HH + EMP)], where EMP is total employment and b = regional employment / regional households
Job Mix Diversity	1-[ABS(b*RE - NRE) /(B*RE + NRE)], Where NRE is non-retail employment and b = regional non retail employment / regional retail employment
Design Measures	The only available urban design indicator is the number of intersections, calculated using the Tele Atlas street network.
Mix Employment, Household and Intersection Density	Ln {[Int*(Emp*a) * (HH*b)] /[Int + (Emp*a) + (HH*b)]}, where: Int= Number of local intersections in 1/2 mile of centroid Emp= Employment within 1/2 mile of centroid HH= Households within 1/2 mile of centroid a= average Int / average Emp b= average Int / average HH
Intersection Density	3-way + 4-way intersections / Area
Street Density	Total street length in 1/2 mile radius
Connectivity Index	Proportion of 4-way intersections
Accessibility Measures	Accessibility variables are proportional to the number of opportunities (such as jobs or retail opportunities) that can be reached by auto, transit or walk means.
Transit Accessibility Logsum	$TrLogsum_p = Ln\left(\sum_q \exp\left(-0.025 * (TransitTime_{pq} - AutoTime_{pq}) + \ln(Emp_q)\right)\right)$ Where $TransitTime_{pq}$ is total transit time including a weight of 2 on all out-of-vehicle time components.
Transit Accessibility to Jobs	Employment within x minutes of transit (walk access), where x is a category 0-30mins, 30-60mins etc.
Transit Accessibility to Retail	Retail employment within 30 minutes of transit (walk)
Transit Stop Density	Number of transit stops / Area
Non-Motorized Accessibility	$WalkAcc_p = Ln\left(\sum_q exp\left(-2.0 * Distance_{pq} + ln(Emp_q)\right)\right)$

The mix employment, household and intersection density indicator proved to be the strongest design and density indicator for this region. Figure 3-1 shows how this mix density measure varies over the most urbanized areas in the SCAG region. It is highest in areas that combine high residential, employment and intersection density –Los Angeles Central Business District (CBD), Santa Monica and Wilshire Boulevard, West Hollywood, Burbank, Glendale, Long Beach, and parts of Santa Ana and Orange.

Figure 3-1: Mixed Employment, Residential and Intersection Density



Utility Structure

The utility (U_{az}) of having (a) autos available for a household of type (h) located in zone (z) is given by

$$U_{az} = \alpha_a + \sum\sum \beta_{hk} \times N_{hk} + \delta_{az} \times TrnAcc_z + \gamma_z \times MixDen_z + \theta_z \times WlkAcc_z$$

This expression includes household attributes, listed below, which are entered as indicator variables with coefficients that vary for each choice. In addition, it includes three location-specific measures that capture land use form as well as accessibility by means other than auto. Land use form is represented via the mixed residential, employment and intersection variable. Accessibility is measured in two ways: walk accessibility, and transit accessibility relative to auto. The mathematical formulation of these variables is shown in Table 3-2. The following variables were examined, proved to be significant in the utility functions, and were selected for the final model:

- Household Size – 1, 2, 3, 4 or more persons
- Household Income (in $2011)
    - Low income (less than $35,000)
    - Medium income ($35,000-$74,999)

  - High income ($75,000 or more)
  - Very high income ($150,000 or more)
- Number of Workers in Household – 0, 1, 2, 3 or more workers
- Type of Housing Unit
  - Single-Family Detached
  - Multi-Family (duplex, apartment, and condominium)
- Transit Accessibility
- Mixed Household, Employment, and Intersection Density
- Non Motorized Accessibility

Estimation Results

Table 3-3 shows the final auto availability model estimation results. All variables show expected, logical signs, and most are significant at 95% confidence. Auto availability increases with household size, household income and the number of workers in the household, and decreases for households living in multi-family housing. Auto availability decreases with increasing transit and walk accessibility to employment, and also decreases with increasing mixed density. The reference categories are very high income, one person, and zero workers, respectively for the household income, household size and household worker indicator variables.

Many of the candidate density and design variables showed logical, statistically significant effects on their own, but they tended to be correlated with each other. The mixed density measure was preferred because it responds to changes in residential and employment density, as well as urban form density (as measured by the number of intersections).

Table 3-3: Auto Availability Estimation Results

	Auto Availability Choice							
	1 Car		2 Cars		3 Cars		4+ Cars	
	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
Household Income ($2011)								
Low (less than $35,000)	-0.465	-7.0	-1.604	-22.9	-2.396	-28.5	-3.032	-26.6
Medium ($35,000 - $74,999)	1.067	11.9	0.766	8.4	0.402	4.1	0.109	1.0
High ($75,000 - $150,000)	1.765	11.5	2.126	13.8	1.971	12.6	1.929	11.9
Very High ($150,000 or more)	0.000	n/a	0.000	n/a	0.000	n/a	0.000	n/a
Household Size								
1 Person HH	0.000	n/a	0.000	n/a	0.000	n/a	0.000	n/a
2 Person HH	0.126	2.2	1.253	20.9	0.177	2.5	-0.520	-5.6
3 Person HH	0.081	1.0	1.294	15.1	1.836	20.3	0.947	8.9
4+ Person HH	0.112	1.2	1.633	17.0	2.092	20.4	2.306	21.2
Workers in HH								
0 Worker HH	0.000	n/a	0.000	n/a	0.000	n/a	0.000	n/a
1 Worker HH	1.014	19.7	1.497	26.4	0.935	14.1	0.200	2.4
2 Workers HH	0.852	8.7	2.902	29.7	2.628	25.5	2.109	19.1
3+ Workers HH	0.889	1.6	2.081	3.7	3.249	5.8	4.617	8.3
Multi-Family Housing	-0.608	-11.8	-1.516	-26.8	-2.147	-30.0	-2.575	-23.9
Mix Emp, Hhld. And Int. Density	-0.119	-6.2	-0.141	-7.0	-0.170	-8.1	-0.192	-8.4
Non Motorized Accessibility								
Low < 500 jobs	0.000	n/a	0.000	n/a	0.000	n/a	0.000	n/a
Medium: 500 – 1,000 jobs	-0.002	-0.04	-0.158	-2.3	-0.161	-2.0	-0.260	-2.3
High: 1,000 – 5,000 jobs	-0.007	-0.10	-0.205	-2.8	-0.328	-3.7	-0.528	-2.8

Very high: > 5,000 jobs	-0.368	-1.9	-0.458	-1.9	-0.587	-1.7	-0.787	-1.9
Transit Accessibility Logsum								
Low: <=10	0.000	n/a	0.000	n/a	0.000	n/a	0.000	n/a
Medium: 10-12	0.000	n/a	0.000	n/a	0.000	n/a	0.000	n/a
High:12-14	-0.404	-6.7	-0.662	-10.2	-0.871	-12.0	-0.959	-11.0
Very high:>14	-1.478	-4.0	-2.490	-4.2	--2.490	-4.2	-2.490	4.2
Constant	2.529	14.2	2.333	12.7	2.442	12.6	2.569	12.2

Notes:

Observations:	*35,026*
Final log likelihood:	*37,663*
Rho-Squared (zero):	*0.332*
Rho-Squared (constants):	*0.222*

Model Calibration

The final model parameter specification is shown in Table 3-4.

Table 3-4: Auto Availability Model Calibration Results

			Auto Availability Choice Coefficients				
County		**Sub Air Basin Name**	**0 car**	**1 car**	**2 cars**	**3 cars**	**4+ cars**
Ventura	11	'SCCAB (VENTURA COUNTY)'	-0.078	2.594	2.400	2.393	2.011
Los Angeles	21	'SCAB (LOS ANGELES COUNTY)'	-5.222	2.463	4.872	6.442	6.663
	31	'MDAB (ANTELOPE VALLEY)'	-4.238	2.267	2.871	3.078	3.059
Orange	22	'SCAB (ORANGE COUNTY)'	-0.327	2.386	2.383	2.661	2.411
Riverside	23	'SCAB (RIVERSIDE COUNTY)'	-0.109	2.483	2.312	2.599	2.462
	35	'MDAB (RIV DESERT)'	-0.040	2.512	2.281	2.579	2.512
	36	'MDAB (BLYTHE)'	-0.132	2.354	2.398	2.640	2.596
	41	'SSAB (COACHELLA VALLEY)'	1.059	2.139	2.408	2.430	2.855
SBD	24	'SCAB (SAN BERNARDINO CO)'	0.609	2.638	2.479	1.834	1.555
	32	'MDAB (VICTOR VALLEY)'	-0.570	2.479	2.218	2.783	2.653
	34	'MDAB (SBD DESERT)'	0.321	2.602	2.494	2.205	1.255
	33	'MDAB (SEALES VALLEY)'	0.019	2.751	2.465	2.066	1.141
Imperial	42	'SSAB (IMPERIAL/WEST)'	0.522	2.420	2.310	2.619	2.282
	43	'SSAB (IMPERIAL/EAST)'	1.373	2.809	1.661	2.111	0.765
	44	'SSAB (IMPERIAL PM2.5 NON-ATT)	0.294	2.436	2.318	2.561	2.325

The model was applied to the 2012 base year, with all density measures computed at the Tier 2 zone level. The 2012 model forecast was validated to ACS 2008-2012 release data. A comparison of the model forecast to CTPP 2012 and ACS 2008-2012 data, for each county in the SCAG region, is shown in and Table 3-5.

Table 3-5: Year 2012 Auto Availability Forecast – County of Residence Validation

ACS 2008-2012 Auto Availability						
Residence County	**0Cars**	**1Car**	**2Cars**	**3Cars**	**4+Cars**	**Total**
Imperial	5,391	16,169	17,929	7,962	4,052	**51,503**
Los Angeles	312,021	1,125,522	1,128,717	430,780	221,252	**3,218,292**
Orange	47,069	284,327	412,597	159,718	84,622	**988,333**
Riverside	33,586	201,885	265,675	116,809	58,641	**676,596**
San Bernardino	34,596	177,110	230,947	107,884	59,732	**610,269**
Ventura	11,828	70,030	105,740	49,849	25,534	**262,981**
Total	**444,491**	**1,875,043**	**2,161,605**	**873,002**	**453,833**	**5,807,974**
2012 Model Forecast						
Residence County	**0Cars**	**1Car**	**2Cars**	**3Cars**	**4+Cars**	**Total**
Imperial	5,413	15,752	17,711	8,452	4,461	**51,789**
Los Angeles	317,249	1,158,744	1,174,654	451,710	242,653	**3,345,011**
Orange	48,779	297,396	422,478	162,014	92,312	**1,022,980**
Riverside	35,946	211,455	278,446	129,023	65,201	**720,070**
San Bernardino	35,019	182,370	242,713	117,613	66,087	**643,802**
Ventura	12,350	73,360	112,705	50,740	28,752	**277,907**
Total	**454,757**	**1,939,078**	**2,248,706**	**919,552**	**499,466**	**6,061,558**
Forecast Difference (%), County Normalized						
Residence County	**0Cars**	**1Car**	**2Cars**	**3Cars**	**4+Cars**	**Total**
Imperial	-0.14%	-3.12%	-1.76%	5.56%	9.48%	0.0%
Los Angeles	-2.18%	-0.95%	0.13%	0.89%	5.52%	0.0%
Orange	0.12%	1.05%	-1.07%	-2.00%	5.39%	0.0%
Riverside	0.56%	-1.58%	-1.52%	3.79%	4.47%	0.0%
San Bernardino	-4.05%	-2.39%	-0.38%	3.34%	4.88%	0.0%
Ventura	-1.20%	-0.87%	0.86%	-3.68%	6.55%	0.0%
Total	**-1.97%**	**-0.91%**	**-0.32%**	**0.93%**	**5.45%**	**0.0%**

An important validation measure is to ascertain whether the model matches the observed pattern of auto availability level by urban form geographies. A comparison of auto availability obtained from ACS data to the model estimates, classified into density or accessibility bins, shows that the model reproduces the observed patterns, in the aggregate. Similarly, a comparison of zero car households at the Regional Statistical Area (RSA) level shows that the model predicts well the number of zero-car households and the total number of available vehicles. Tables 3-6 to 3-8 and Figures 3-2 and 3-3 provide more information.

Table 3-6: Auto Availability Validation to Mix Employment, Household and Intersection Density

Auto Availability	Share of Households by Mix Density Level							
	ACS 2008-2012				Model 2012 Estimate			
	Low	Meduim	High	Very High	Low	Meduim	High	Very High
0	3%	4%	7%	13%	3%	6%	12%	24%
1	24%	27%	32%	43%	24%	31%	43%	47%
2	42%	40%	37%	32%	39%	39%	34%	25%
3	20%	19%	15%	9%	22%	15%	7%	3%
4+	10%	10%	8%	4%	11%	9%	4%	1%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Table 3-7: Auto Availability Validation to Non Motorized Accessibility

Auto Availability	Share of Households by Non Motorized Accessibility							
	ACS 2008-2012				Model 2012 Estimate			
	Low	Meduim	High	Very High	Low	Meduim	High	Very High
0	4%	8%	13%	25%	6%	10%	12%	32%
1	25%	33%	43%	43%	29%	37%	40%	34%
2	41%	37%	32%	26%	38%	35%	34%	24%
3	20%	15%	9%	4%	17%	11%	10%	6%
4+	10%	8%	4%	2%	9%	7%	5%	3%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Table 3-8: Auto Availability Validation to Transit Accessibility Logsum

Auto Availability	Share of Households by Transit Accessibility Logsum							
	ACS 2008-2012				Model 2012 Estimate			
	Low	Meduim	High	Very High	Low	Meduim	High	Very High
0	5%	5%	7%	17%	4%	2%	13%	0%
1	29%	27%	33%	42%	27%	19%	44%	0%
2	40%	40%	38%	29%	39%	40%	34%	0%
3	18%	19%	15%	8%	20%	25%	6%	0%
4+	9%	9%	8%	4%	10%	13%	3%	0%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**0%**

Figure 3-2: Validation of Zero Car Households for Regional Statistical Areas

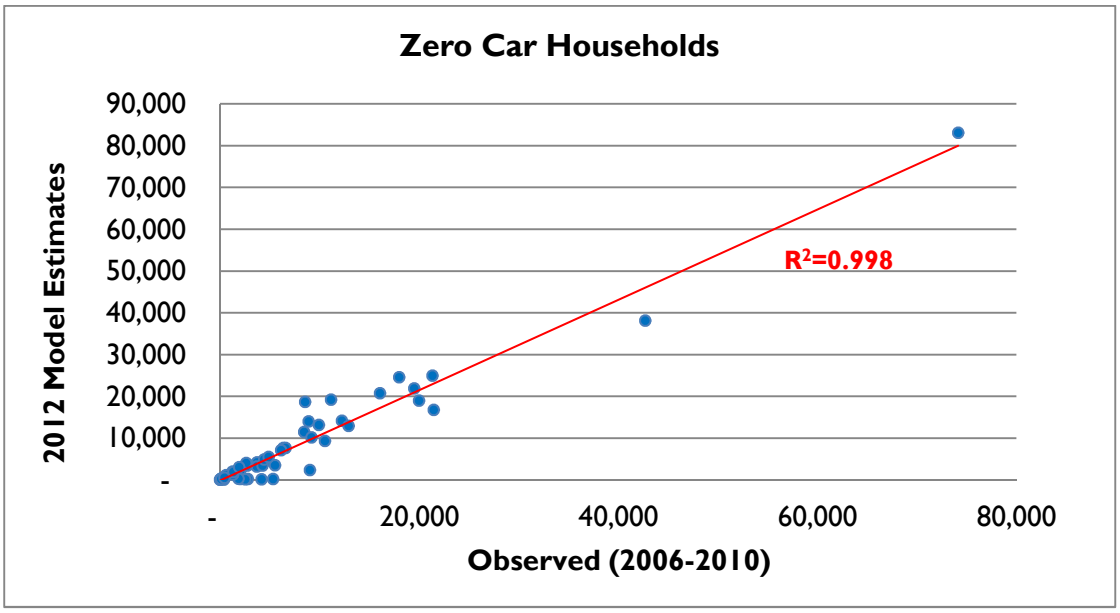
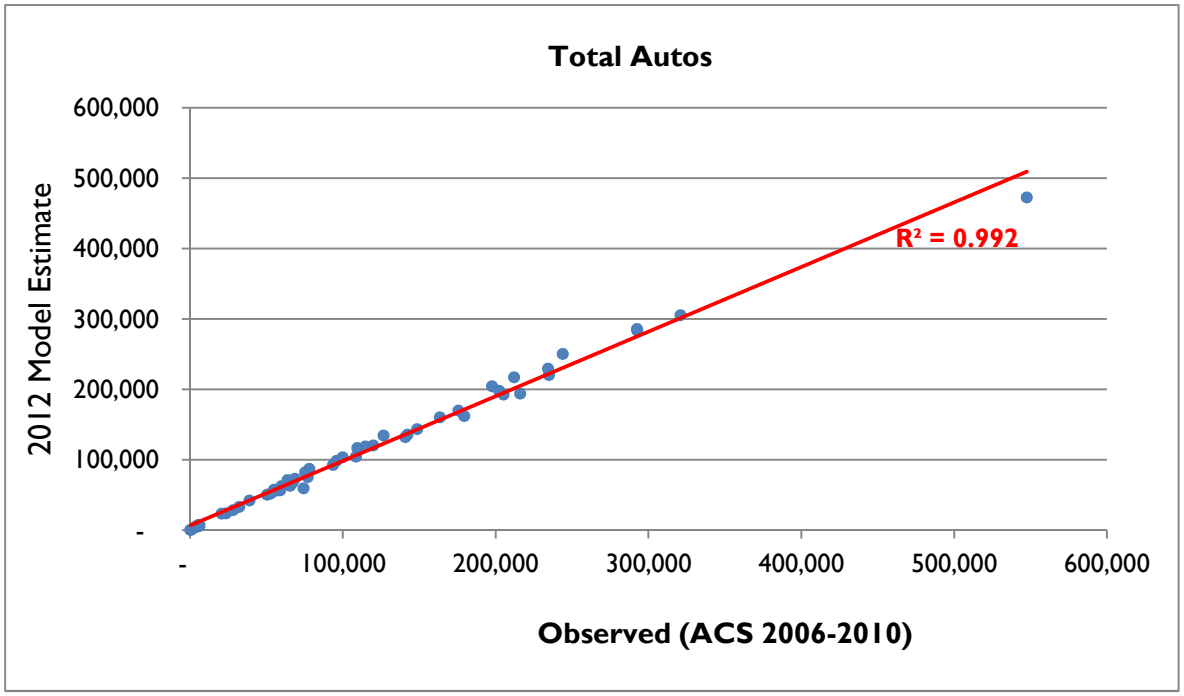


Figure 3-3: Validation of Total Auto Availability for Regional Statistical Areas



Trip Market Segmentation

Market segmentation is the technique used in trip-based models to subdivide the population into groups expected to exhibit similar travel behavior. The model segmentation is partly determined by the availability of survey and census data to identify specific markets or population subgroups and support the estimation and validation of separate models for each subgroup.

Trip Purposes

The internal person trip market is stratified into the ten purposes listed in Table 3-9. The external trip market is segmented into internal-external and external-external (IE/EI) trips.

Table 3-9: Trip Purposes

Purpose	Description
HBWD	Home Based Work - Direct
HBWS	Home Based Work - Strategic
HBCU	Home Based College and University
HBSC	Home Based School
HBSH	Home Based Shop
HBSR	Home Based Social and Recreation
HBSP	Home Based Serve Passenger
HBO	Home Based Other
WBO	Non Home Based Work
OBO	Non Home Based Other

Time Periods

As is customary in a trip-based model, the SCAG model segments the demand models (auto ownership, trip generation, trip distribution, and mode choice) into two time periods - peak and off-peak. The peak periods are 6:00 AM to 9:00 AM in the morning and 3:00 PM to 7:00 PM in the evening. The transit assignments are also performed for these two time periods.

The model uses five periods for highway assignment. The five highway assignment time periods are:

- AM Peak: 6:00 AM to 9:00 AM
- Midday: 9:00 AM to 3:00 PM
- PM Peak: 3:00 PM to 7:00 PM
- Evening: 7:00 PM to 9:00 PM
- Night: 9:00 PM to 6:00 AM

A representative peak period travel time is fed back from the highway assignment to the demand model. This representative time is a weighted average of the AM peak travel time and the PM peak travel time (transposed), where the weights equal the proportion of peak period trips that occur in the AM and PM periods respectively.

Household Classifications

In addition to trip purpose and time period, the trip market is further defined by household attributes. The proposed classifications for each model component are summarized in Table 3-10. The groups to be used for each household classification variable are the following:

- Household Income: low (less than $35,000, medium ($35,000 to $74,999), high ($75,000 to $149,999) and very high ($150,000 and more), in 2011 dollars.
- Household Size: one, two, three, four or more persons in household.
- Workers in Household: zero, one, two, three or more workers in household.
- Auto Availability: zero, one, two, three, and four or more autos in household.
- Type of Housing Unit: single-family detached unit, all other unit types.
- Age of Head of Household: 18 to 24, 25 to 44, 45 to 64, 65 years old or older.
- Age: number of household members younger than 5, 5 to 17, 18 to 24, 25 years old or older.

Table 3-10: Person and Household Attributes

Model	Hhld. Income	Hhld. Size	Hhld Workers	Auto Availability	Type of Housing Unit	Age of Head of Hhld.	Age
Auto Ownership	X	X	X		X		
Trip Production							
HBW, WBO	X		X	X		X	
HBSC, HBCU							X
HBO, OBO	X	X		X			
Trip Distribution							
HBW, WBO	X		X	X			
HBO, OBO	X	X		X			
Mode Choice	X						
HBW, WBO	X		X	X			
HBO, OBO	X	X		X			

The trip production, destination choice and mode choice models use a market stratification defined by household income and car sufficiency. Car sufficiency is defined relative to household workers for HBW trips, and relative to household size for HBO trips. The specification of each stratum is shown in Table 3-11.

Table 3-11: Trip Market Strata

Trip Market	HBW Trips	HBO Trips
1	Zero car households, all incomes	Zero car households, all incomes
2	Households with fewer cars than workers, all incomes	1 car, 2+ person households, all incomes
3	Equal or more cars than workers, income less than $35,000	1 car, 1 person households or 2+ car households, and income less than $35,000
4	Equal or more cars than workers, income equal or higher than $35,000 and less than $75,000	1 car, 1 person households or 2+ car households, and income equal or higher than $35,000 and less than $75,000
5	Equal or more cars than workers, and income equal or higher than $75,000	1 car, 1 person households or 2+ car households, and income equal or higher than $75,000

Trip Productions Model

Introduction

The trip productions model predicts average weekday trip frequency for each household trip type. It takes the form of a cross-classification model. The productions represent total daily trips for all travel modes (auto, transit and non-motorized). Trip rates per household are applied to the estimate of households classified across various attributes. The household classifications vary with the trip purpose. Unlike previous versions of the SCAG model, these classifications are now prepared off-model using a population synthesizer. The relationship between trip frequency and land use density was explored during the trip rate estimation process; no consistent, statistically significant relationship was found between total daily person trips and various measures of land use density and diversity, after controlling for household attributes such as income, size and vehicles available.

Estimation Dataset

The 2012 California Household Travel Survey and SCAG Add-on Survey provided the data for the trip rate estimation. The trip sample size by purpose is shown in Table 3-12.

Table 3-12: Trip Sample Size

Trip Purpose	Count	Percentage
HBWD	21,336	18%
HBWS	6,498	6%
HBSC	6,872	6%
HBU	2,048	2%
HBSH	11,386	10%
HBSR	10,559	9%
HBSP	12,276	10%
HBO	17,699	15%
WBO	7,386	6%
OBO	21,471	18%
Total	**117,531**	**100%**

Home-Based Work Trip Productions Models

The household classification variables chosen for the HBW trip productions model are number of workers, household income, and age of the head of household. Other classification variables were tested, including household size and auto availability. Separate trip rates were estimated for direct and strategic trips. Household classes with few observations were collapsed to obtain a large enough sub-sample. Table 3-13 shows the HBWD trip production rates; Table 3-14 shows the HBWS trip production rates. As expected, the HBW trip rates increase with the number of workers in the household. Households headed by young (18-24 years old) and senior (65 years old or older) persons exhibit lower trip rates than other households. HBW trip rates tend to increase with household income. The rates shown in Table 3-13 are applied separately by auto availability, so that the HBW trip productions can be reported over car sufficiency and income groups, for input to the trip distribution and mode choice models.

Table 3-13: HBWD Trip Production Rates

Workers	Age of Head of Household	Household Income ($2011)			
		<35K	35K-75K	75K-150K	>150K
1	18-24	1.222	1.327	1.414	1.424
1	25-44	1.449	1.435	1.426	1.422
1	45-64	1.261	1.289	1.293	1.420
1	65+	1.259	1.312	1.280	1.350
2	18-24	2.203	2.147	2.159	2.168
2	25-44	2.428	2.431	2.532	2.606
2	45-64	2.466	2.526	2.534	2.526
2	65+	2.324	2.685	2.527	2.486
3+	18-24	3.056	3.224	3.339	3.369
3+	25-44	3.643	4.111	4.218	4.144
3+	45-64	3.721	3.947	4.063	4.020
3+	65+	3.325	3.404	3.568	3.687

Table 3-14: HBWS Trip Production Rates

Workers	Age of Head of Household	Household Income ($2011)			
		<35K	35K-75K	75K-150K	>150K
1	18-24	0.203	0.177	0.170	0.181
1	25-44	0.266	0.305	0.327	0.342
1	45-64	0.247	0.256	0.281	0.324
1	65+	0.238	0.187	0.223	0.244
2	18-24	0.441	0.505	0.508	0.510
2	25-44	0.552	0.553	0.664	0.655
2	45-64	0.535	0.536	0.591	0.629
2	65+	0.303	0.322	0.564	0.635
3+	18-24	0.544	0.575	0.596	0.600
3+	25-44	0.675	0.753	0.706	0.804
3+	45-64	0.617	0.671	0.697	0.781
3+	65+	0.509	0.521	0.502	0.518

Home-Based School (HBSC) and Home-Based College (HBCU) Trip Productions Models

The HBSC trip productions were estimated based on the number of school-age children in a household. A classification of households by the number of children aged 5 to 17 years old is prepared off-model, along with all the other household classifications. The HBSC trip rates are shown in Table 3-15.

The HBCU trip productions are estimated based on the number of college-age persons in the household, household income, and the group quarters population. The HBCU trip rates are shown in Table 3-16.

Table 3-15: HBSC Trip Production Rates

Number of Household Members 5-17 years old	Trip Rate
0	0.140
1	1.583
2	2.302
3+	4.282

Table 3-16: HBCU Trip Production Rates

Household Income ($2011)	Number of Household Members 17 to 25 years old		
	0	1	2+
0-35K	0.054	0.351	0.466
35K-75K	0.097	0.368	0.550
75K-150K	0.052	0.370	0.552
150K+	0.052	0.372	0.554

Home-Based Non-Work (HBNW) Trip Productions Models

The household classification variables chosen for the HBNW trip productions model are household size, income and auto availability. Separate trip rates were estimated for HBSH, HBSR, HBSP, and HBO trips. Household classes with few observations were collapsed to obtain a large enough sub-sample. The HBNW trip production rates are shown in Table 3-17. As expected, the HBNW trip rates increase with household size and with auto availability. The HBNW trip rates do not vary much with household income, but the income classification was kept so it is available for trip distribution and mode choice.

Table 3-17: HBNW Trip Production Rates

Auto Availability	Household Income	Household Size	Trip Production Rates			
			HBSH	HBSR	HBSP	HBO
0	0-35K	1	0.410	0.370	0.050	0.670
		2	0.720	0.640	0.160	.1.030
		3	0.640	0.750	1.180	1.370
		4+	0.1.240	1.010	0.850	1.950
	35K-75K	1	0.250	0.370	0.50	0.670
		2	0.450	0.650	0.140	1.030

Auto Availability	Household Income	Household Size	Trip Production Rates			
			HBSH	HBSR	HBSP	HBO
		3	0.640	0.750	1.180	1.030
		4+	0.1.140	1.010	0.850	2.010
	75K-150K	1	0.250	0.370	0.040	0.670
		2	0.430	0.660	0.130	.1.030
		3	0.640	0.750	1.140	1.370
		4+	0.1.140	1.010	0.810	2.770
	150K+	1	0.250	0.370	0.040	0.670
		2	0.430	0.660	0.120	1.030
		3	0.640	0.750	0.1.130	1.370
		4+	0.1.140	1.010	.0.850	2.770
1	0-35K	1	0.410	0.410	0.090	0.770
		2	0.770	0.820	0.480	1.090
		3	0.920	1.110	1.450	1.450
		4+	1.650	1.380	3.010	2.010
	35K-75K	1	0.300	0.510	0.070	0.770
		2	0.630	0.830	0.370	1.100
		3	0.730	.1.130	1.430	1.470
		4+	1.330	1.540	2.890	2.060
	75K-150K	1	0.300	0.520	0.050	0.770
		2	0.550	0.850	0.320	1.270
		3	0.730	1.150	1.410	1.500
		4+	1.330	1.850	2.800	2.830
	150K+	1	0.300	0.530	0.050	0.770
		2	0.650	0.850	0.140	1.270
		3	0.730	.1.170	1.400	1.750
		4+	1.330	1.900	2.780	2.830
2	0-35K	1	0.450	0.450	0.060	0.790
		2	0.770	0.850	0.300	1.380
		3	1.920	1.200	1.170	1.450
		4+	1.1270	1.550	2.930	2.350
	35K-75K	1	0.300	0.520	0.060	0.840
		2	0.700	0.880	0.200	1.190
		3	0.720	.1.220	1.120	1.470
		4+	1.030	1.740	2.810	2.410
	75K-150K	1	0.300	0.550	0.040	0.850
		2	0.630	0.890	0.170	1.330
		3	0.720	1.240	1.650	1.680
		4+	1.860	1.900	2.720	3.000
	150K+	1	0.300	0.590	0.040	0.940
		2	0.570	0.900	0.170	1.330
		3	0.720	1.250	0.650	1.680
		4+	1.860	1.2.180	2.720	3.000
3+	0-35K	1	0.450	0.600	0.060	0.790
		2	0.770	0.640	0.340	1.380
		3	1.130	0.750	0.580	1650
		4+	1.270	1.010	2.630	2.350
	35K-75K	1	0.400	600	0.060	0.840
		2	0.710	0.990	0.260	1.200
		3	0.750	1.240	.0.400	1.740
		4+	1.370	1.750	2.520	3.000
	75K-150K	1	0.400	0.600	0.040	0.850

Auto Availability	Household Income	Household Size	Trip Production Rates			
			HBSH	HBSR	HBSP	HBO
		2	0.710	.1.010	0.240	1.240
		3	0.750	1.260	0.300	1.750
		4+	1.060	1.940	2.440	3.000
	150K+	1	0.400	600	0.040	0.140
		2	0.590	.1.030	0.220	1.280
		3	0.170	.300	0.280	1.750
		4+	1.060	2.180	2.430	3.000

Non-Home Based (NHB) Trip Productions Models

The household classification variables chosen for the NHB trip productions are income, workers and age of householder for work-based trips; and income, size and auto availability for all other non-home based trips Table 3-18 and Table 3-19 show the WBO and OBO trip rates, respectively.

Table 3-18: WBO Trip Production Rates

Workers in Household	Household Size	Household Income ($2011)			
		<35K	35K-75K	75K-150K	>150K
1	1	0.380	0.460	0.600	0.600
	2	0.300	0.770	0.700	0.550
	3	0.400	0.750	0.720	0.620
	4+	0.400	0.410	0.430	0.590
2	1				
	2	0.730	0.880	0.950	0.910
	3	0.760	0.880	1.470	1.470
	4+	0.760	0.660	0.810	0.920
3+	1				
	2				
	3	0.460	0.460	0.630	1.640
	4+	0.510	0.510	1.070	2.010

Table 3-19: OBO Trip Production Rates

		Trip Production Rates			
Household Income	Household Size	Auto Availability			
		0	1	2	3+
0-35K	1	0.0.420	1.150	1.360	1.400
	2	1.100	1.780	1.850	1.850
	3	1.420	2.470	2.550	2.410
	4+	2.320	3.480	3.510	3.550
35K-75K	1	0.420	1.150	1.370	1.420
	2	1.100	1.780	1.850	2.080
	3	1.500	2.470	2.500	2.540
	4+	2.320	3.620	3.650	3.700

75K-150K	1	0.420	1.170	1.370	1.460
	2	1.100	1.780	1.920	1.890
	3	1.520	2.470	2.550	2.550
	4+	2.320	3.620	3.700	3.720
150K+	1	0.420	1.170	1.370	1.460
	2	1.100	1.860	1.930	1.890
	3	1.520	2.490	2.790	2.790
	4+	2.320	3.620	3.700	3.730

Trip Attractions Model

The trip attraction models for all non-HBW purposes are linear regression models that estimate attractions for each trip purpose, and then allocate total attractions to car ownership/income markets in proportion to the share of productions by household income in each car ownership market. The models are applied in two steps. First, total attractions for each purpose are calculated using the attraction equations shown in Table 3-20. For HBSH trips, attractions are estimated by applying a trip rate R to the zonal retail employment. The steps for calculating R are as follows:

Step 1: Calculate regionwide resident population to retail employment ratio, R1.
Step 2: Calculate the same ratio for each RSA, R2.
Step 3: Calculate for each RSA the relative retail service index RSI = R2/R1.
Step 4: Range bracket RSI to 0.5 – 1.5.
Step 5: Assign this RSI to each TAZ of that RSA
Step 6: Apply the equation R = 2.105 + 4.108*RSI to estimate the attraction rate

The trip attraction regression models forecast total attractions by TAZ for all non-HBW purposes. An allocation process is applied to segment the HBSH, HBSR, HBSP and HBO attractions into the household markets used by the trip distribution and mode choice models -- zero cars all income, car insufficient all income, car sufficient low income, car sufficient medium income and car sufficient high income. This process allocates total TAZ attractions to household trip markets in proportion to the share of trip productions in the market.

The HBSC and HBCU attraction models are based on school and university enrollment, respectively. The trip attraction rates are shown in Table 3-21. In application, the school productions get allocated to school attractions within the same school district. This is accomplished by balancing the trips at the school district level. Similarly, the group quarters population is assigned to a college location, to keep the model from assigning some of these students to the wrong campus. There are several instances of student dormitories located on a TAZ adjacent to the campus TAZ, so not all of the group quarters population HBCU trips are intra-zonal trips.

Table 3-20: HBSC and HBCU Trip Attraction Rates

Trip Purpose	Trip Attraction Rate (attractions per enrolled student)	R^2
Home-Based School	1.326	0.84
Home-Based College, non GQ	0.542	0.77
Home-Based College, GQ	1.500	n/a

The HBWD and HBWS attraction models are linear equations based on thirteen categories of employment. Given that the relative attractiveness of jobs varies depending on the type of worker and residential location, the coefficients of the attraction models vary by household market and by the production TAZ.

Table 3-21: Trip Attraction Model Regression Coefficients

Trip Purpose	Households	Total Employment	Residential Population	Low-Wage Employment	Medium-Wage Employment	High-Wage Employment	Retail	Information	Professional Services	Education & Health Services	Arts, Entertainment, Accommodations and Food Services	Other Services	Public Administration	K12 Enrollment	College Enrollment
HBWD1 Low Inc.				1.181											
HBWD2 Med Inc.					1.040										
HBWD3 High Inc.						1.040									
HBWS1 Low Inc.				0.324											
HBWS2 Med Inc.					0.339										
HBWS3 High Inc.						0.347									
HBCU															0.549
HBSC														1.326	
HBO			0.270				0.993			0.544	0.993	0.993	3.439		
HBSR			0.166								2.126				
HBSP			0.357							0.703					
OBO Attraction	0.508	0.180					4.678			0.698	3.136	3.303			
WBO Attraction	0.036	0.202					0.513				1.147				
OBO Production	0.538	0.162					4.393			1.118	2.568	3.784			
WBO Production		0.137						0.227	0.250			5.743			

Trip Production Model Validation

The model was validated to the expanded 2012 California survey and SCAG Add-on surveys.

Table 3-22 shows a comparison of seurvey vs. model genereated by trip purposes. As shown, the model generates trips by purpose within 4% of the observed trips and replicates overall of the total observed trips.

Table 3-22: Trip Production Validation to Household Survey, 2012

Trip Purpose	2012 Household Survey	2012 Model Estimate	% Diff.
HBWD	8,960,693	9,220,900	3%
HBWS	1,884,606	1,939,400	3%
HBSC	4,718,142	4,581,800	-3%
HBCU	699,938	672,600	-4%
HBSH	4,897,836	4,803,000	-2%
HBSR	7,409,153	7,380,700	0%
HBO	10,575,864	10,457,300	-1%
HBSP	6,433,085	6,541,300	2%
OBO	14,579,200	14,566,100	0%
WBO	3,372,527	3,221,700	-4%
Total	**63,531,045**	**63,384,800**	**0%**

Tables 3-23 and 3-24 provide summary statistics for person trips, by county and for the SCAG region. Table 3-23 shows the summary of trips by county and trip purpose. Table 3-24 identifies selected comparative statistics, such as trips per household, trips per vehicle, and trips per capita (resident person).

Table 3-23: Year 2012 Trip Generation Summary by Trip Purpose and by County

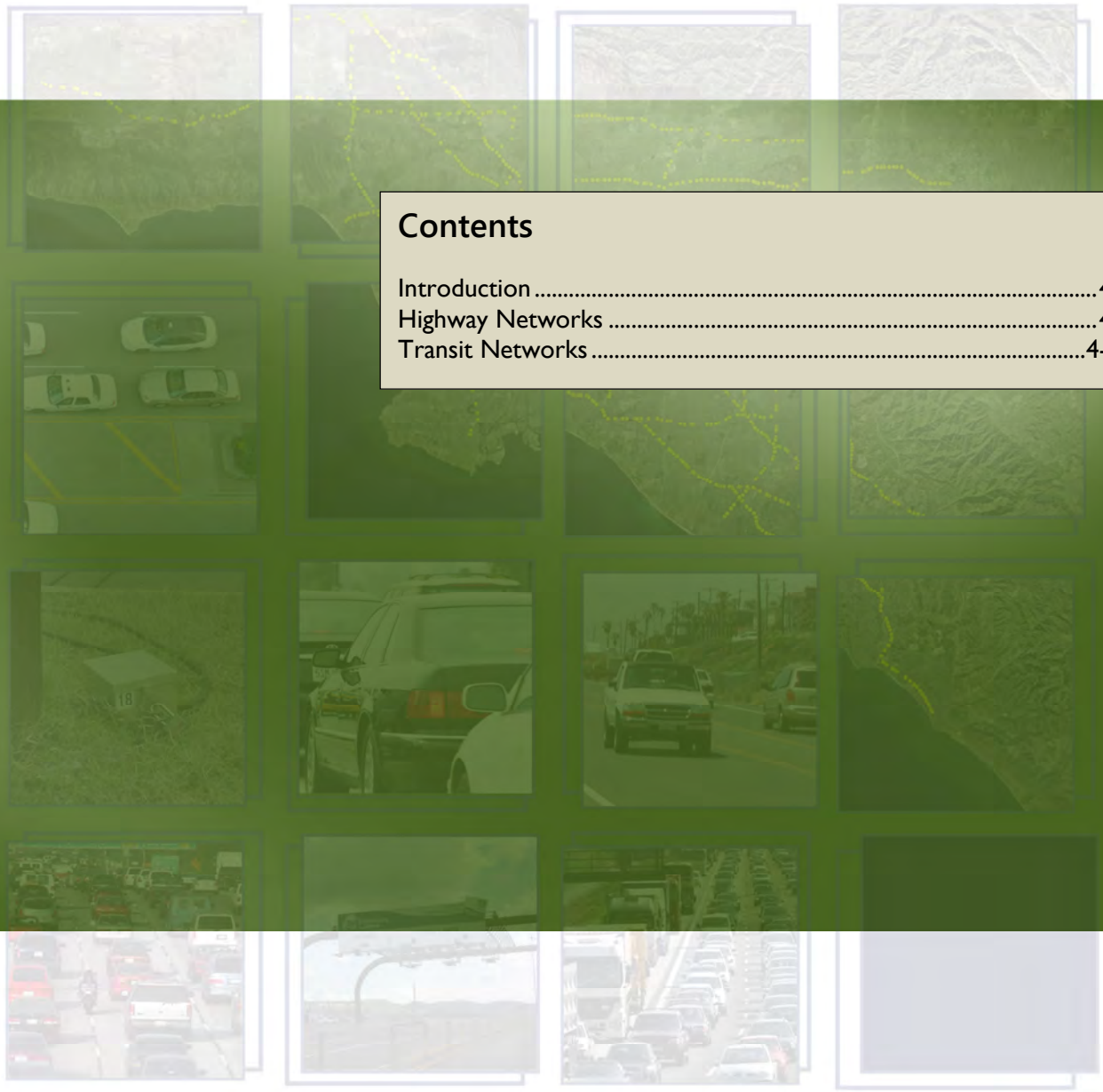
Trip Purpose	Person Trip Productions						
	Imperial	Los Angeles	Orange	Riverside	San Bernardino	Ventura	Model Area Total
HBWD No Cars	1,263	170,046	44,254	8,455	9,657	3,442	237,118
HBWD Car Competition	2,311	653,243	242,313	40,790	31,666	21,798	992,122
HBWD Car Suf. 0-35K	12,114	656,328	125,391	137,228	128,569	37,611	1,097,239
HBWD Car Suf. 35-75K	22,472	1,350,697	336,893	305,793	313,851	105,537	2,435,244
HBWD Car Suf. over 75K	27,573	2,293,232	899,330	500,739	466,813	271,443	4,459,128
HBWS No Cars	264	33,721	8,874	1,536	1,757	618	46,770
HBWS Car Competition	495	127,031	46,885	8,190	6,255	4,366	193,222
HBWS Car Suf. 0-35K	2,610	127,443	24,472	27,762	25,047	7,627	214,961
HBWS Car Suf. 35-75K	4,915	273,174	68,307	64,295	63,355	21,624	495,670
HBWS Car Suf. over 75K	6,660	505,287	201,042	113,862	101,394	60,504	988,749
Total Home Based Work	**80,677**	**6,190,202**	**1,997,760**	**1,208,650**	**1,148,364**	**534,570**	**11,160,224**
HBSC	54,225	2,364,977	728,604	624,276	598,887	210,829	4,581,798
HBCU	4,919	371,566	115,640	72,646	78,147	29,667	672,584
HBSH	45,756	2,610,630	796,113	590,246	542,793	217,428	4,802,966
HBSR	58,033	3,968,957	1,269,293	904,225	829,449	350,728	7,380,684
HBSP	66,830	3,502,833	1,061,550	834,248	783,820	292,038	6,541,319
HBO	80,765	5,633,979	1,788,291	1,284,038	1,176,697	493,552	10,457,322
Total Home Based Non Work	**310,528**	**18,452,941**	**5,759,491**	**4,309,678**	**4,009,793**	**1,594,242**	**34,436,673**
WBO	10,349	1,908,675	637,281	260,673	274,285	130,390	3,221,653
OBO	91,668	8,148,298	2,770,067	1,477,801	1,423,448	654,810	14,566,092
Total Non-Home Based	**102,017**	**10,056,974**	**3,407,347**	**1,738,474**	**1,697,734**	**785,200**	**17,787,745**
Total Person Trips	**493,222**	**34,700,117**	**11,164,598**	**7,256,802**	**6,855,890**	**2,914,012**	**63,384,641**

Table 3-24: Year 2012 Trip Generation Comparative Statistics

Home Based Work Trips	Imperial	Los Angeles	Orange	Riverside	San Bernardino	Ventura	Model Area Total
Trips	80,677	6,190,202	1,997,760	1,208,650	1,148,364	534,570	11,160,224
Trips per Household	1.63	1.90	2.00	1.74	1.87	1.99	1.90
Trips per Vehicle	0.84	1.04	0.98	0.83	0.87	0.92	0.98
Trips per Worker	1.52	1.57	1.55	1.56	1.63	1.54	1.57
% Home Based Work Trips	16.36%	17.84%	17.89%	16.66%	16.75%	18.34%	17.61%
Home Based Non Work Trips	**Imperial**	**Los Angeles**	**Orange**	**Riverside**	**San Bernardino**	**Ventura**	**Model Area Total**
Trips	310,528	18,452,941	5,759,491	4,309,678	4,009,793	1,594,242	34,436,673
Trips per Household	6.28	5.67	5.76	6.21	6.52	5.92	5.85
Trips per Vehicle	3.21	3.10	2.82	2.97	3.04	2.75	3.01
Trips per Person	1.73	1.86	1.88	1.92	1.94	1.91	1.88
% Home Based Non Work Trips	62.96%	53.18%	51.59%	59.39%	58.49%	54.71%	54.33%

Non Home Based Trips	Imperial	Los Angeles	Orange	Riverside	San Bernardino	Ventura	Model Area Total
Trips	102,017	10,056,974	3,407,347	1,738,474	1,697,734	785,200	17,787,745
Trips per Household	2.06	3.09	3.41	2.50	2.76	2.92	3.02
Trips per Vehicle	1.06	1.69	1.67	1.20	1.29	1.35	1.55
Trips per Person	0.57	1.01	1.11	0.77	0.82	0.94	0.97
% Home Based Non Work Trips	20.68%	28.98%	30.52%	23.96%	24.76%	26.95%	28.06%
Total Trips	**Imperial**	**Los Angeles**	**Orange**	**Riverside**	**San Bernardino**	**Ventura**	**Model Area Total**
Trips	493,222	34,700,117	11,164,598	7,256,802	6,855,890	2,914,012	63,384,641
Trips per Household	9.98	10.66	11.17	10.45	11.14	10.82	10.77
Trips per Vehicle	5.11	5.83	5.46	5.01	5.20	5.02	5.54
Trips per Person	2.75	3.50	3.63	3.23	3.32	3.49	3.46

Chapter 4 - Transportation Networks



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CHAPTER 4 – TRANSPORTATION NETWORKS

Introduction

This section summarizes the highway, transit, toll, and heavy-duty truck networks used in the Year 2012 Regional Travel Model Validation.

The Year 2012 highway network went through an extensive review to examine network coding accuracy and to ensure proper network connectivity. Once complete, the transit network was built directly off of the highway network ensuring an integrated network approach.

Attributes for the Year 2012 highway network were determined based on the Federal Highway Functional Classification system, SCAG highway network, and inputs from sub-regional and regional agencies. SCAG conducted an extensive review of the Year 2012 highway network using aerial photography to examine network coding accuracy and ensure proper network connectivity. The new highway network was distributed to interested transportation commissions and Caltrans districts for further review. Several meetings of these agencies were conducted to discuss coding conventions and to accept comments.

Sensitivity model runs using the new networks were performed, and loaded volumes plots were carefully examined to ensure proper network flows and connectivity. A summary of the number of links, roadway centerline miles, and number of lane miles in the highway network is provided later in this chapter (see Table 4-7). The free flow speed and roadway capacity used by trip distribution and assignment were assigned to the network using speed/capacity lookup tables (see Tables 4-1through 4-6).

The transit network is a key input to the mode choice model and is used in the transit trip assignment process. All elements used to determine level of service for transit mode choice calculations are identified and defined in this section. The various transit modes (e.g., Metrolink, local bus) that constitute the mode choice set are also identified.

Highway Networks

In 2007-08, SCAG conducted an extensive Highway Network Inventory program to gather information on the regional highway network and to transfer attributes to SCAG's TransCAD network. The Highway Inventory was built on a very detailed geographic information system (GIS) network that included over 21,000 centerline miles for all freeways, arterials, and urban major collectors. This GIS data was later transferred to the TransCAD-based 2008 highway network. A detailed review and update of the highway network was completed using aerial photography to ensure the base year network accurately represented 2012 conditions.

As part of the network inventory, primary and secondary attributes were geo-coded. Primary attributes were identified as critical to the performance of the travel demand model and include:

- Speed Limits
- Number of Lanes (by time period)
- Intersection Control (at model nodes)
- Median Type
- Directionality (one-way versus two-way streets)

Secondary attributes include:

- Linear Reference System Based on Model Network
- Shoulder type
- Other Controlled Intersections
- Parking
- School Zones
- Advisory Speeds
- HOV Access
- Ramp Gore Points
- Bike Lanes

The highway network was developed and coded using the TransCAD Transportation Planning Software. TransCAD uses a GIS-based network approach to ensure geographic accuracy and provide enhanced editing capabilities. The GIS-based database structure allows for an almost unlimited number of attributes and is very flexible. The Year 2012 highway network includes detailed coding of the region's freeway system (e.g., mixed-flow lane, auxiliary lane, HOV lane, toll lane, and truck lane), arterials, major collectors, and some minor collectors. To simulate roadside parking restrictions and other lane changes during the day, separate networks were developed for each of the following five modeling time periods:

- AM peak period (6:00 AM to 9:00 AM)
- PM peak period (3:00 PM to 7:00 PM)
- Midday period (9:00 AM to 3:00 PM)
- Evening period (7:00 PM to 9:00 PM)
- Night period (9:00 PM to 6:00 AM)

Facility Types

The facility type (FT) definitions used in SCAG's Year 2012 highway network are generally consistent with the Federal Functional Highway Classification system. The major categories used for defining facility type are as follows:

- FT 10 - Freeways
- FT 20 - HOV
- FT 30 - Expressway/Parkway
- FT 40 - Principal Arterial
- FT 50 - Minor Arterial
- FT 60 - Major Collector

- FT 70 - Minor Collector
- FT 80 - Ramps
- FT 90 - Truck lanes
- FT 100 - Centroid connector

Area Types

The area types (AT) used in the highway network were prepared based on development density (population and employment density) and other land use characteristics. The area types used in the highway network are:

- AT 1 - Core
- AT 2 - Central Business District
- AT 3 - Urban Business District
- AT 4 - Urban
- AT 5 - Suburban
- AT 6 - Rural
- AT 7 - Mountain

Free Flow Speeds and Capacities

Free-flow speeds and capacities assigned to each link in the highway network were determined based on the posted speed (PS), facility type and area type of each link. Free flow speeds and capacities are presented in Tables 4-1 through 4-6.

Table 4-1: Year 2012 Freeway/Expressway Free-Flow Speed

Functional Class	AT1	AT2	AT3	AT4	AT5	AT6	AT7
Freeway	PS+5	PS+5	PS+5	PS+5	PS+5	PS+5	PS+5
HOV	PS+5	PS+5	PS+5	PS+5	PS+5	PS+5	PS+5
Expressway (Limited Access)	PS+5	PS+5	PS+5	PS+5	PS+5	PS+5	PS+5
Fwy-Fwy Connector	45	45	50	50	55	55	55
On-Ramp (peak)	15	15	20	20	30	35	35
On-Ramp (off-peak)	25	25	30	30	35	35	35
Off-Ramp	25	25	30	30	35	35	35

Notes:
AT1: Core *AT3: Urban Business District* *AT5: Suburban* *AT7: Mountain*
AT2: Central Business District *AT4: Urban* *AT6: Rural* *PS = Posted Speed*

Table 4-2: Year 2012 Arterial Free-Flow Speed

Posted Speed		AT1	AT2	AT3	AT4	AT5	AT6	AT7
		-- Principal Arterial --						
20		21	22	22	24	25	27	27
25		23	24	25	27	28	31	31
30		25	26	27	29	31	34	34
35		27	28	29	32	35	38	38
40		28	30	32	34	37	41	41
45		30	32	34	37	40	45	45
50		33	35	37	41	45	51	51
55		34	38	39	44	49	56	56
		-- Minor Arterial --						
20		19	20	21	23	24	27	27
25		21	22	23	25	27	30	30
30		22	24	25	28	30	34	34
35		24	26	27	30	33	37	37
40		25	28	29	32	36	41	41
45		27	29	31	34	38	44	44
50		29	32	33	38	43	50	50
55		30	33	35	40	46	55	55
		-- Major Collector --						
20		17	18	19	21	23	26	26
25		18	20	21	23	26	30	30
30		19	21	22	25	28	33	33
35		20	22	24	27	31	36	36
40		21	24	25	28	33	39	39
45		22	25	26	30	35	43	43
50		23	27	28	33	39	48	48
55		24	28	30	35	42	52	52

Notes: *Add 4% for divided streets*

AT1: Core
AT2: Central Business District
AT3: Urban Business District
AT4: Urban
AT5: Suburban
AT6: Rural
AT7: Mountain

Table 4-3: Year 2012 Arterial / Expressway Capacity (Signal Spacing <2 miles)

On\Crossing		2-Lane	4-Lane	6-Lane	8-Lane
		-- AT1_Core --			
2-Lane		475	425	375	375
4-Lane		650	600	500	500
6-Lane		825	700	600	550
8-Lane		825	700	650	600
		-- AT2_Central Business District --			
2-Lane		575	525	475	475
4-Lane		725	675	550	550
6-Lane		875	750	650	600
8-Lane		875	750	700	650
		-- AT3_Urban Business District --			
2-Lane		600	525	475	475
4-Lane		750	675	575	575
6-Lane		900	775	675	625
8-Lane		900	775	725	675
		-- AT4_Urban --			
2-Lane		625	550	500	500
4-Lane		800	725	600	600
6-Lane		950	825	700	650
8-Lane		950	825	775	700
		-- AT5_Suburban --			
2-Lane		675	600	525	525
4-Lane		825	750	625	625
6-Lane		975	850	750	675
8-Lane		975	850	800	750
		-- AT6_Rural --			
2-Lane		675	600	525	525
4-Lane		825	750	625	625
6-Lane		975	850	750	675
8-Lane		975	850	800	750
		-- AT7_Mountain --			
2-Lane		575	500	425	425
4-Lane		750	675	550	550
6-Lane		925	800	700	625
8-Lane		925	800	750	700

Notes: Capacities are in passenger car per lane per hour (pcplph).
Lanes are mid-block 2-way lanes.
Add 20% for one-way streets.
Add 5% for divided streets.

Table 4-4: Year 2012 Arterial / Expressway Capacity (Signal Spacing >=2 Miles)

Type	Posted Speed	Capacity (Per Lane)
Multi-Lane Highway	45	1,600
	50	1,700
	55	1,800
	60	1,900
2-Lane Highway	--	1,400

Table 4-5: Year 2012 Freeway Capacity

Type	Posted Speed (mile per hour)	Capacity (passenger car per lane per hour)
Freeway/HOV	55 and below	1,900
	60 and 65	2,000
	70 and above	2,100
Freeway-Freeway Connector	40 and below	1,400
	45	1,600
	50	1,700
	55	1,800
	60 and above	1,900
Auxiliary Lane	--	1,000

Table 4-6: Year 2012 Ramp Capacity

	AT1	AT2	AT3	AT4	AT5	AT6	AT7
On-Ramp (first lane)	720	720	720	720	1,400	1,400	1,400
On-Ramp (additional lane)	480	480	480	480	600	1,400	1,400
On-Ramp (off-peak)	1,300	1,300	1,300	1,300	1,400	1,400	1,400

Notes: Use arterial/expressway capacity estimation procedure for off-ramps.
AT1: Core
AT2: Central Business District
AT3: Urban Business District
AT4: Urban
AT5: Suburban
AT6: Rural
AT7: Mountain

Toll Roads

The 2012 highway network incorporates all toll facilities, including the SR- 91 Express Lanes and the San Joaquin Eastern and Foothill Toll Roads developed by the Transportation Corridor Agency (TCA). All toll facilities are located in Orange County.

Heavy Duty Truck Designation

The Year 2012 highway network incorporates special network coding that allows for heavy-duty trucks to be converted into Passenger Car Equivalents (PCE). This conversion enables the model to account for the effects of trucks on link capacity in the mixed flow vehicle traffic stream. The highway network also includes coding to identify truck-only lanes and truck climbing lanes.

Freeway Lane Type

For the purpose of the Regional Model, the Year 2012 highway network includes a detailed coding of the region's freeway system. Freeway lanes are identified by the following three lane types:

- ***Freeway Main Lane*** (Through Lane) includes continuous freeway lanes that extend more than 2 miles and that pass through at least one interchange.
- ***Freeway Auxiliary Lane*** (Auxiliary Lane of Capacity Significance) includes auxiliary freeway lanes that extend more than one mile or that extend from interchange to interchange.
- ***Freeway Acceleration/Deceleration Lane*** (Other Freeway Lane) includes all types of acceleration and deceleration lanes or freeway widening that do not satisfy the conditions for main lane and auxiliary lane classifications.

Year 2012 Highway Network Summary

Table 4-7 summarizes the Year 2012 Highway Network by tallying the number of highway facility routes and lane-miles represented in the network for each county and facility type. The route mile summary includes both directions of travel, even if the roadway is represented by two separate one-way links in the coded network. Figures 4-1 through 4-3 depict the Year 2012 highway network by facility type and area type. Figure 4-4 shows the locations of the external cordon sites on the network at the modeling area's boundary.

Table 4-7: Year 2012 Highway Network Summary

County	Centerline Miles	Lane Miles				
		AM Peak	Midday	PM Peak	Evening	Night
Freeway (Mixed-Flow, excluding HOV and Toll Facilities)						
Imperial	95	380	380	380	380	380
Los Angeles	634	4,581	4,581	4,581	4,581	4,581
Orange	167	1,298	1,298	1,298	1,298	1,298
Riverside	307	1,727	1,727	1,727	1,727	1,727
San Bernardino	472	2,534	2,534	2,534	2,534	2,534
Ventura	94	528	528	528	528	528
Subtotal	**1,770**	**11,048**	**11,048**	**11,048**	**11,048**	**11,048**
Toll Facilities (including HOT)						
Imperial	0	0	0	0	0	0
Los Angeles	0	0	0	0	0	0
Orange	61	329	329	329	329	329
Riverside	0	1	1	1	1	1
San Bernardino	0	0	0	0	0	0
Ventura	0	0	0	0	0	0
Subtotal	**61**	**330**	**330**	**330**	**330**	**330**
Freeway (HOV)						
Imperial	0	0	0	0	0	0
Los Angeles	246	505	505	505	505	505
Orange	114	233	233	233	233	233
Riverside	40	82	82	82	82	82
San Bernardino	52	105	105	105	105	105
Ventura	0	0	0	0	0	0
Subtotal	**453**	**926**	**926**	**926**	**926**	**926**
Major Arterial						
Imperial	183	611	611	611	611	611
Los Angeles	1,941	8,351	8,346	8,351	8,343	8,345
Orange	692	3,493	3,493	3,493	3,493	3,493
Riverside	306	1,208	1,208	1,208	1,208	1,208
San Bernardino	533	1,798	1,798	1,798	1,798	1,798

Ventura	215	795	795	795	795	795
Subtotal	**3,870**	**16,256**	**16,252**	**16,257**	**16,249**	**16,251**
Minor Arterial						
Imperial	266	546	546	546	546	546
Los Angeles	2,868	8,948	8,945	8,947	8,942	8,942
Orange	779	2,733	2,733	2,733	2,733	2,733
Riverside	997	2,870	2,869	2,870	2,869	2,869
San Bernardino	1,448	3,860	3,860	3,860	3,860	3,861
Ventura	357	992	992	992	992	992
Subtotal	**6,715**	**19,949**	**19,946**	**19,949**	**19,943**	**19,943**
Collector						
Imperial	1,217	2,465	2,465	2,465	2,465	2,465
Los Angeles	3,140	6,698	6,697	6,697	6,696	6,696
Orange	380	931	931	931	931	931
Riverside	2,032	4,755	4,755	4,755	4,755	4,755
San Bernardino	3,076	6,507	6,507	6,507	6,507	6,507
Ventura	478	1,010	1,010	1,010	1,010	1,010
Subtotal	**10,323**	**22,366**	**22,366**	**22,366**	**22,364**	**22,365**
Total All Facilities (excluding truck, ramps, centroid connector)						
Imperial	1,760	4,002	4,002	4,002	4,002	4,002
Los Angeles	8,830	29,083	29,075	29,083	29,068	29,070
Orange	2,192	9,017	9,017	9,017	9,017	9,017
Riverside	3,683	10,642	10,642	10,642	10,642	10,642
San Bernardino	5,581	14,805	14,805	14,805	14,805	14,805
Ventura	1,144	3,326	3,326	3,326	3,326	3,325
Total	**23,191**	**70,876**	**70,868**	**70,876**	**70,861**	**70,862**

Figure 4-1: Year 2012 Network by Facility Type

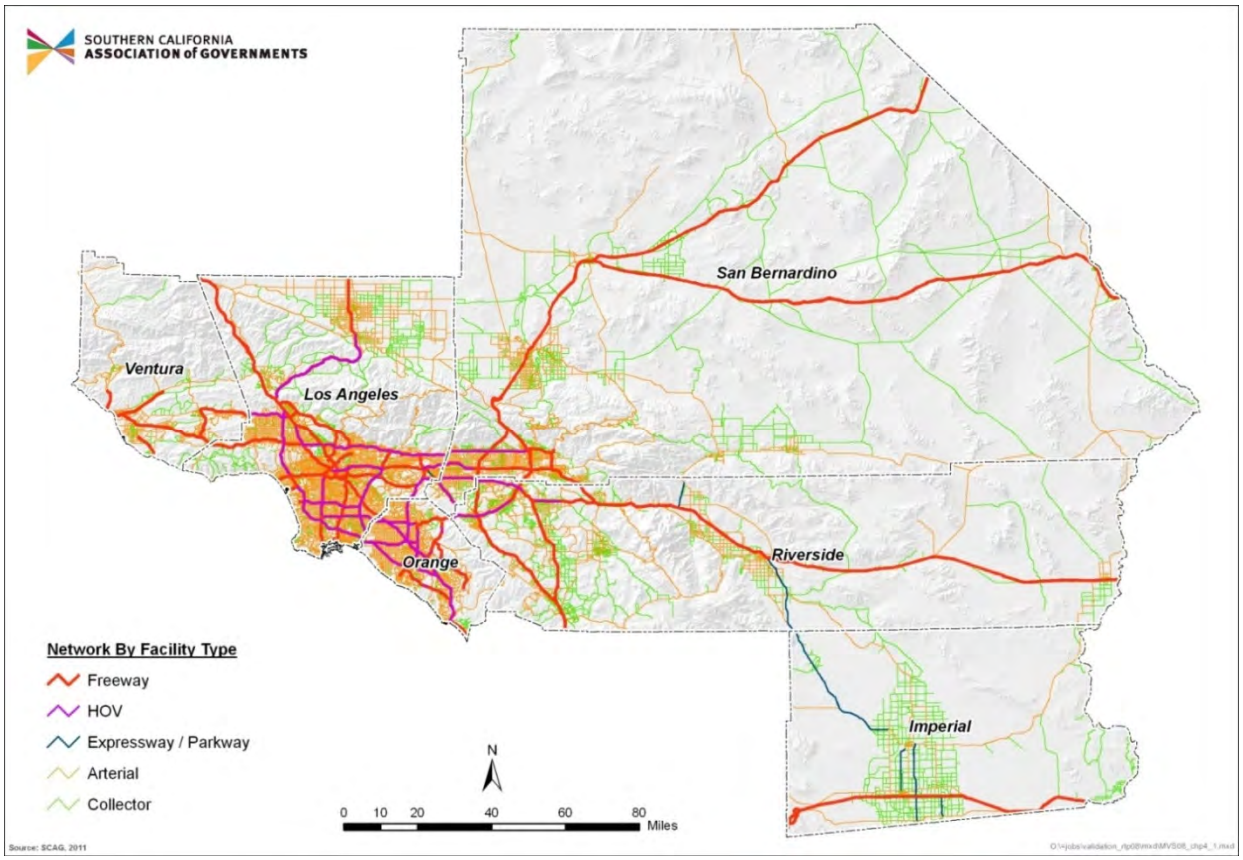


Figure 4-2: Year 2012 Modeling Area by Area Type

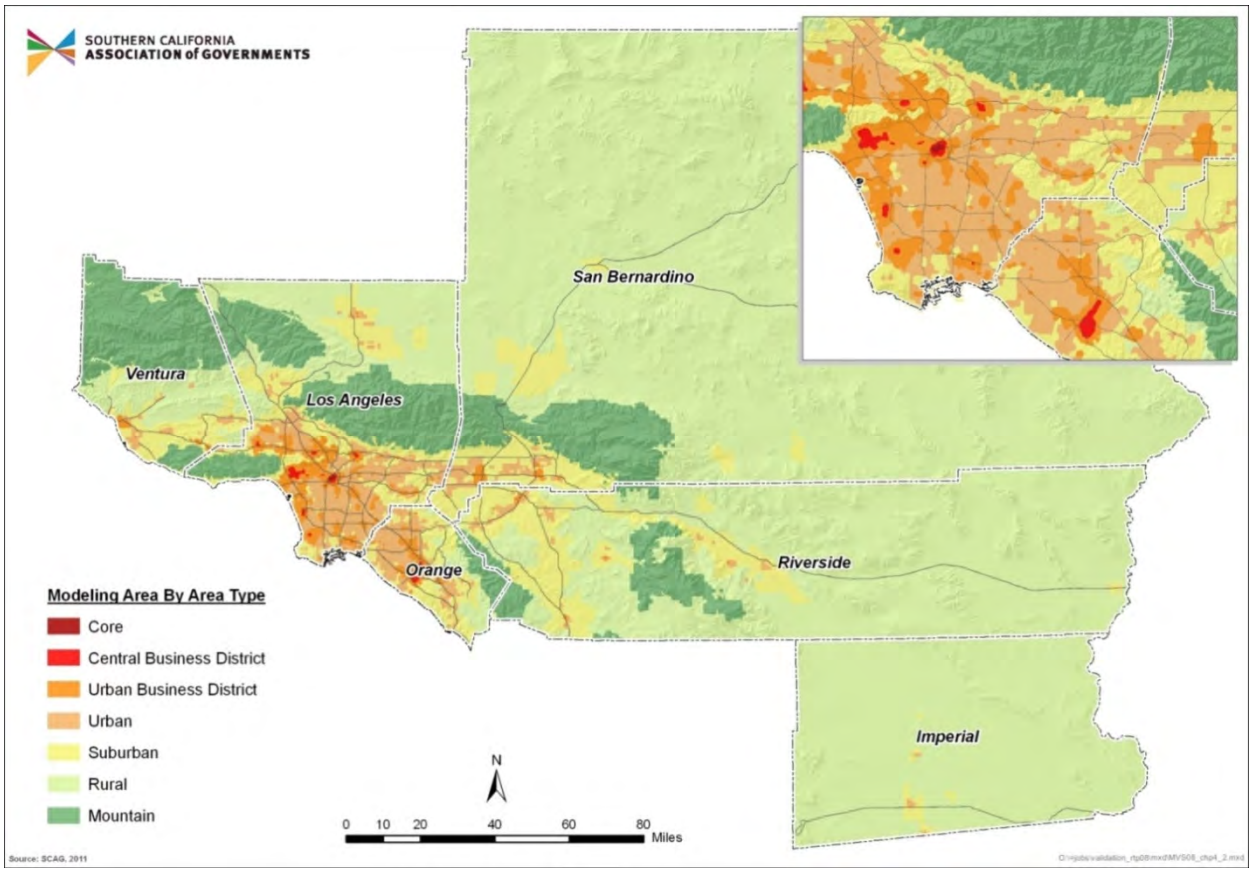


Figure 4-3: Year 2012 Network by Area Type

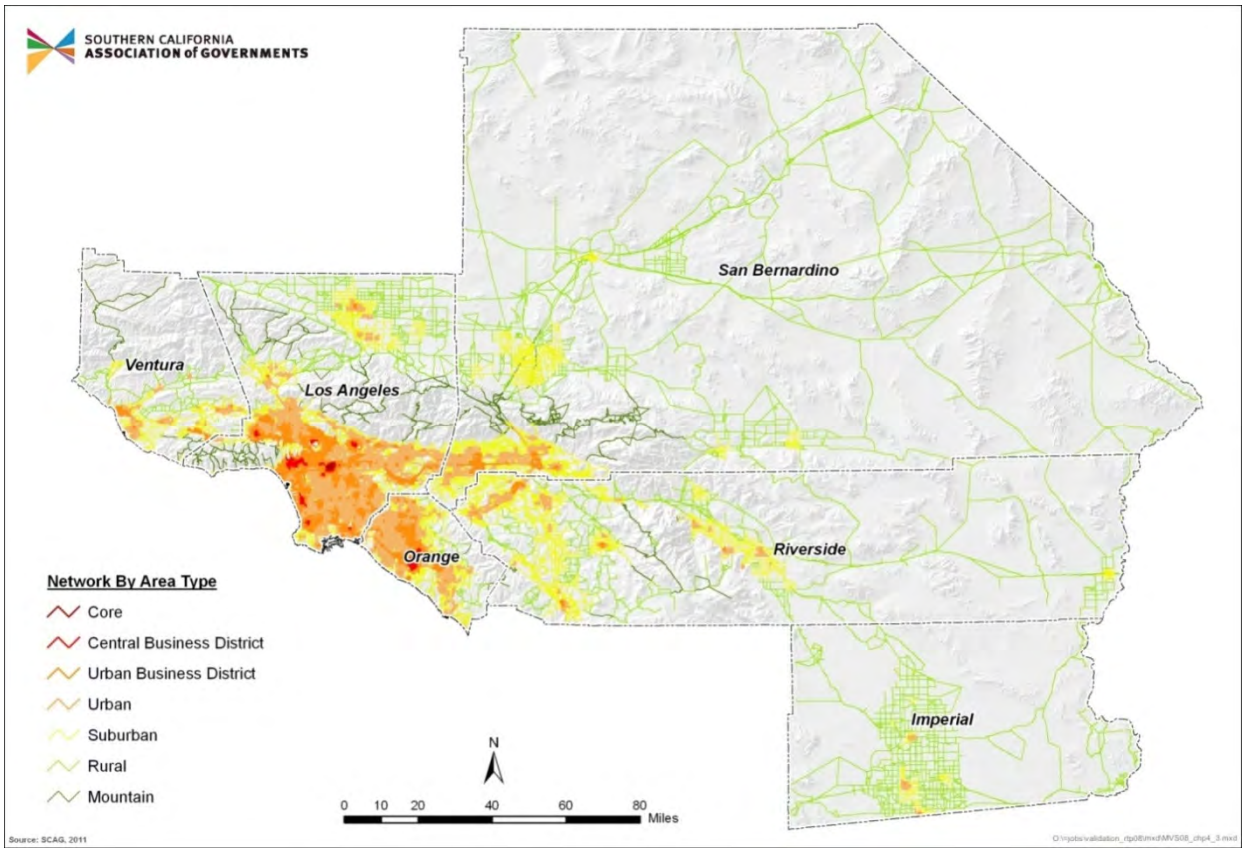
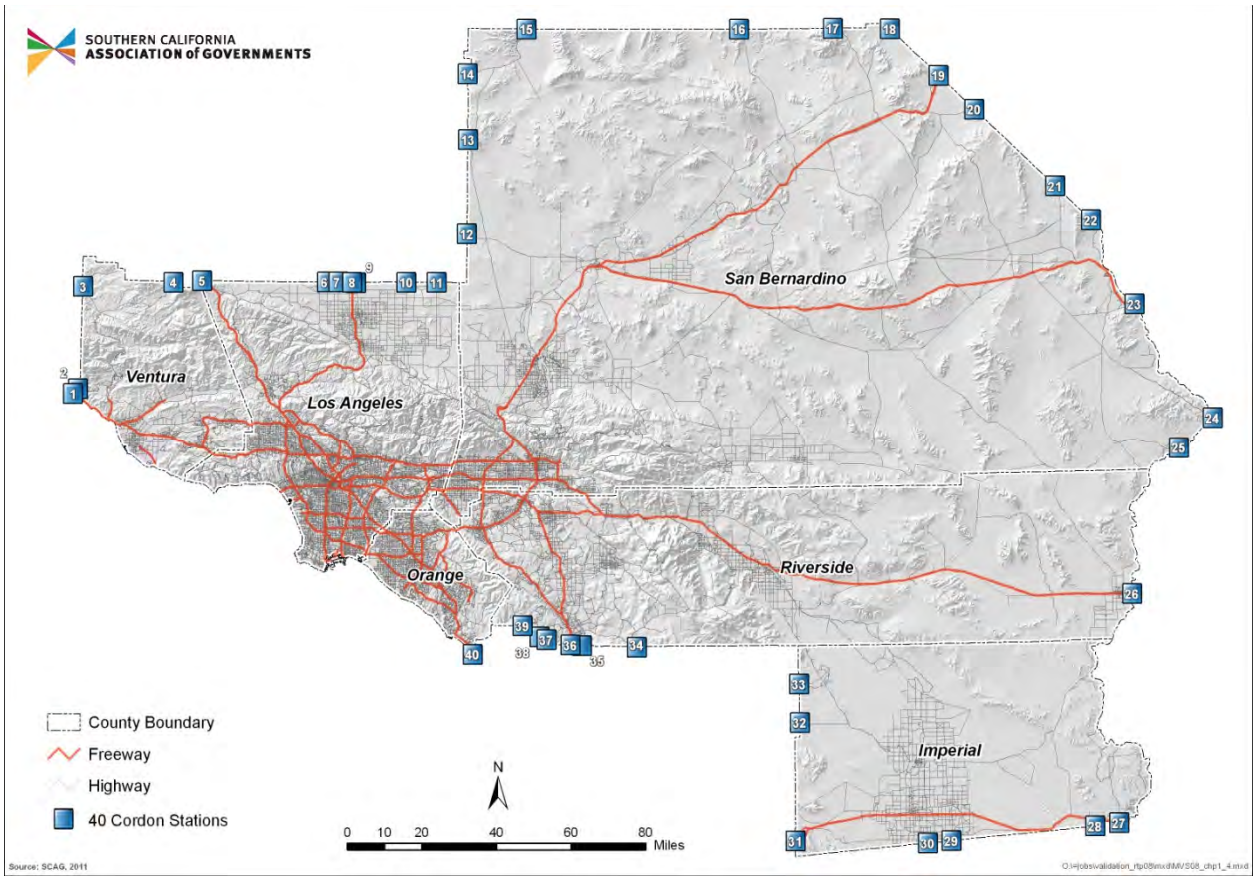


Figure 4-4: Modeling Area External Cordon Locations



Transit Networks

Consistent with the Regional Model highway network, the Year 2012 transit network covers the entire SCAG region, with nearly 3,000 transit route patterns for more than 70 transit carriers in six counties. The year 2012 transit network includes the following key features:

- Uses a more comprehensive transit database that covers key attributes of the Los Angeles County Metropolitan Transit Authority TripMaster and FTA National Transit Database (NTD) for the SCAG region.
- Automatically separates out all route patterns that have different pairs of start and end stops to calculate headways more accurately.
- Automatically converts TripMaster into the TransCAD transit network.
- Includes coding fares at the route level and fare factors at the carrier level.
- Reflects transit operations by five times of day (AM, MD, PM, EVE, NT), rather than peak and off-peak.
- Uses a TeleAtlas-based street network to create transit walk access/egress links and compute average walk times of all paths from every street node in a TAZ to a nearby stop with the path cost weighted by Census Block Group data

For the Year 2012 transit network, transit services in the SCAG region are grouped into seven transit modes and four non-transit modes, according to their service characteristics and fare structures. An additional mode, High Speed Rail, has been added to future year transit networks. The Year 2012 transit network covers only fixed-route transit services. It does not include dial-a-ride, charter services, airport shuttles, limousines, or Uber/Lyft/taxicabs.

Transit routes in each transit network are characterized by attributes such as route ID, route name, route head sign, transit operator, route distance, direction, transit modes, and fares. The transit network also includes detailed headway, frequency, start time and end time of the service for each of the five time periods.

Stops are placed along the route with information such as route ID, stop coordinates, milepost, and corresponding highway node ID. For rail transit (commuter rail and local rail), station-to-station rail time, rail station information, and Metrolink's fare zone are also coded in the network.

Transit Modes

The following seven transit modes are included in the Year 2012 transit network.

1. Commuter Rail is defined as transit service that has a fixed-guideway, traverses long-distances, has distinctive branding and vehicles, and is mostly used by commuters. In the SCAG region, commuter rail includes Metrolink and Amtrak.
2. Local Rail also has a fixed-guideway, but mainly refers to subway and light rail. Currently, LACMTA runs two subway lines (the red and purple lines) and three light rail lines (the Blue, Gold, and Green lines).
3. Express Bus is defined as transit service with limited stops and a limited span of service that operates partly in mixed-flow freeway traffic and may require an additional fare. Many transit operators in the SCAG region have express bus service.
4. Rapid Bus has limited stops and distinctive branding, but usually does not operate on freeways.
5. Local Bus is the most common bus service that uses local streets and makes frequent stops. Almost every operator runs local bus service.
6. Transitway Bus is similar to the express bus but operates on a semi-dedicated right of way (busway, HOV lanes) with limited stops at freeway stations. In the SCAG region, transitway bus refers to any express bus that uses either El Monte Busway or Harbor Transitway.
7. Bus Rapid Transit (BRT) has limited stops, a dedicated guideway, distinctive branding and vehicles. In Year 2012, only the LACMTA Orange line is considered BRT.

Non-Transit Modes / Transit Access Links

Two types of transit access links are coded in the Year 2012 transit network and described as follows:

- Walk access and egress links - coded as two-way links between a zone centroid and a transit stop location

- Park-and-ride lot to stop and transfers between stations links - coded as two-way walk links between a park-and-ride lot and a transit stop location, and connections between stations

Transit Fares

The Year 2012 transit network includes three types of transit fares: base boarding fares, zone fares, and transfer fares; and two types of fare factors: base fare factor and transfer fare factor. Fare values were collected through the Transit Level of Service Data Collection program and are represented in 2011 dollars. Considering the complex fare structure for most carriers only published full cash fares for initial boarding and transfers are used to represent the base fare and transfer fare. To account for the revenue composition of different fare types, such as one-way walkup fares, daily/weekly/monthly passes, Senior/Student/Disabled fares, and other special fares, base fare factors and transfer fare factors are estimated from the boarding and revenue data provided by transit operators. By applying fare factors to the published full cash fare, the resulting fares represent actual fares paid by an average passenger. Finally, all boarding fares (base fare and transfer fare) are converted to 2011 dollars using a Consumer Price Index (CPI) adjustment factor derived from the CPI factor published by the US Department of Labor for the Los Angeles-Riverside-Orange County metropolitan area.

The fare structure varies significantly by operator and by service for the same operator. For example, LACMTA has both local and express bus service. For local bus, the general fare is a flat rate of $1.50. For express bus, there is a surcharge of $ 0.70 for each zone in addition to the $ 1.50 fare. However, OCTA, another major operator in the region, charges a general fare of $1.50 for local bus. For express bus, the fare is a flat rate of $4.00 or $6.00 depending on the route. To accommodate variations in the fares for different routes, the Year 2012 transit network codes general flat fares (i.e., base fares, transfer fares) at the route level, while the fare factors are calculated at the carrier level.

Two other major operators, Metrolink and Amtrak, follow a zone-based fare structure. For example, Metrolink fares are calculated with a distance-based formula using the shortest driving distance between stations, with an 80-mile maximum charge. To capture the published cash fare between two station pairs, a fare matrix was developed for Metrolink and Amtrak. Similarly, the LACMTA Express bus and Los Angeles Department of Transportation (LADOT) Commuter Express bus that have zone-based fare are also included as a zone-to-zone fare matrix.

Similar to the development of fare factors for flat-rate routes, a fare factor matrix was developed based on Metrolink sales and boarding data to represent the weighted average fare for each station pair. In addition, regression analysis was conducted to generate the relationship between the distance and fares for Metrolink to predict future fares for new stations.

Year 2012 Transit Network Summary

Table 4-8 summarizes the number of transit patterns/routes represented in the peak and off-peak transit network, by "transit mode" as defined above. Figure 4-6 shows the geographic distribution of the existing rail transit network (Metrolink and Local Rail). Figure 4-7 shows the entire Year 2012 transit network.

Table 4-8: Year 2012 Transit Network Route Patterns and Route Pattern Miles

Mode ID(s)	Mode Number	Description	Route Patterns		Route Pattern Miles	
			Peak	Off Peak	Peak	Off Peak
10	1CR	Commuter Rail	36	29	3,109	2,568
11	2LR	Local Rail	13	13	213	210
20-22	3EX	Express Bus	99	66	2,741	1,805
33	4RB	Rapid Bus	78	66	1,201	1,017
30-32	5LB	Local Bus	1,601	1,339	23,062	19,664
23	6TW	Transitway	47	30	1,196	790
19	7BR	Bus Rapid Transit	6	4	76	65
Total			**1,880**	**1,547**	**31,598**	**26,118**

Figure 4-5: Year 2012 Metrolink and Local Rail Network

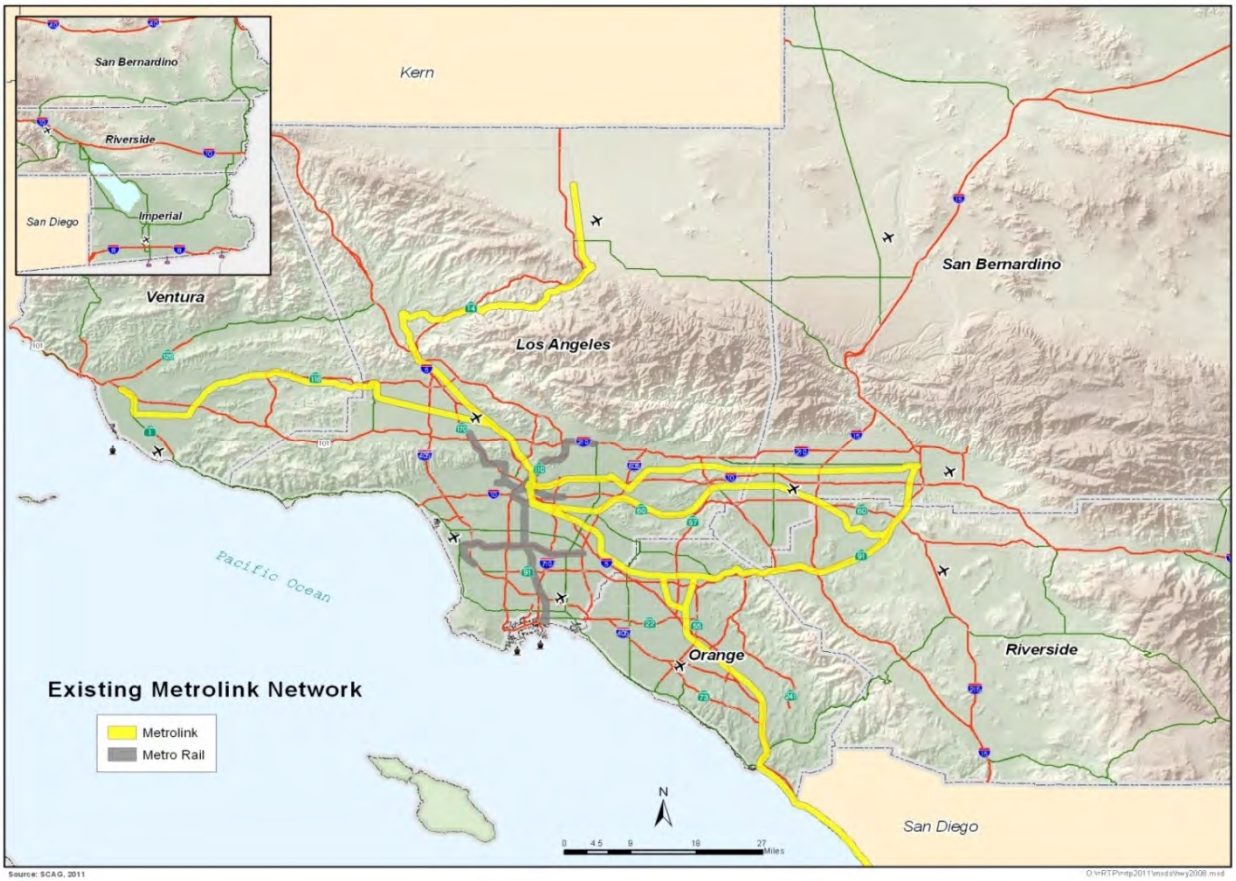
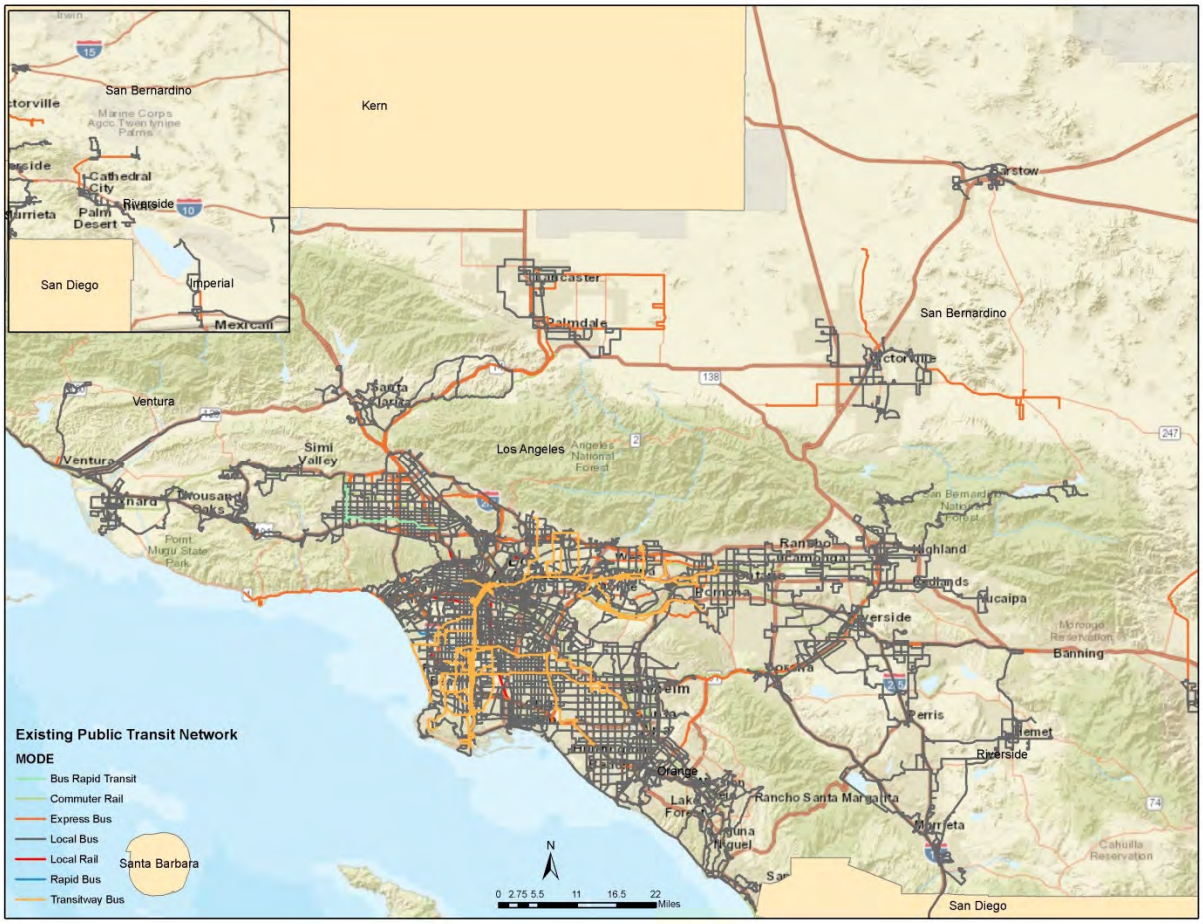


Figure 4-6: Year 2012 Public Transit Network



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SOUTHERN CALIFORNIA ASSOCIATION of GOVERNMENTS

Chapter 5 - Trip Distribution

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CHAPTER 5 – TRIP DISTRIBUTION

Introduction

The SCAG model uses two types of trip distribution models. The HBSC and HBCU distribution models are gravity models. The HBWD, HBWS, HBSH, HBSR, HBSP, HBO, WBO and OBO distribution models are destination choice models.

The destination choice models were estimated in multinomial logit form using the ALOGIT software. The HBWD, HBWS, HBSH, HBSR, HBSP and HBO models are stratified by the car sufficiency/income market segments shown in Table 3-11. The WBO and OBO models are not stratified, as is customary for non-home-based models. The purpose of the model estimation is to obtain an initial set of utility coefficients. In the subsequent calibration phase, the distance-based terms of the utility function were adjusted to improve the model validation. In addition, some distance-based constants were added to better fit the shape of the observed trip length distributions.

Estimation Dataset

The 2012 California Household Travel Survey provided the trip records for model estimation. Because of the large number of destination alternatives (11,267 in the Tier 2 zone system), it is impractical to include all alternatives in the estimation dataset. A sampling-by-importance approach, combined with an exploded sample, was used to choose alternative sets for each trip observation. Each trip record was duplicated 10 times and different choice sets with 40 alternatives each were selected based on the size term and distance. A weight of 1/10 is applied to each observation to scale the standard error. This approach has been shown to produce results that are nearly statistically equivalent to selecting 400 alternatives for the choice set.

As described in Ben-Akiva and Lerman[1], sampling by importance consists of defining an importance function that gives the probability of selection into the sample, and then selecting zones into the destination choice set by sampling with replacement according to these probabilities. The estimator can be shown to give unbiased, consistent and efficient coefficient estimates. The importance function used for the SCAG destination choice models is defined as:

$$W_j = A_j \times exp\left(-2D_{ij}/D\right)$$

$$P_j = \frac{W_j}{\sum_j W_j}$$

Where *D* is the regional observed average distance, *Aj* is a size variable, and *Dij* is the distance to each zone.

[1] Ben-Akiva, M., and S. Lerman. Discrete Choice Analysis. Theory and Application to Travel Demand. MIT Press, 1985.

Main Explanatory Variables

The following variables were examined and proved to be significant in the utility functions:

- Mode choice logsum
- Distance between production zone and potential attraction zone destinations
  - Linear distance
  - Distance squared
  - Distance cubed
- Household income interacted with distance
- Mix employment, household and intersection density (mix density) interacted with distance
- Intra-zonal indicator interacted with mix density
- Auto availability interacted with distance
- Employment by industry

The mode choice logsum coefficients were constrained to a value consistent with utility maximization theory, that is, between 0 and 1.

Utility Structure

The utility (U_{ij}) of choosing destination (j) for a trip (m) produced in zone (i) is given by:

$$U_{ijm} = \theta \times LS_{ijm} + \sum_k \beta^k f^k(D_{ij}) + \sum_k \gamma^k M^k IZ_j + LN(A_{jm}) + c_{jm}$$

Where:

- LS_{ijm} is the mode choice logsum corresponding to trip market (m);
- $\beta^k f^k(D_{ij})$are the terms of a distance polynomial;
- M^k represents attributes of the trip production zone, such as density, interacted with the intra-zonal alternative IZ_j;
- A_{jm} is the size or attraction variable;
- and c_{jm} is an importance sampling correction term.

The sampling correction term compensates for the sampling error in the model estimation (i.e., represents the difference between the sampling probability and final estimated probability for each alternative). This sampling correction term is not included in the utility function when the model is applied, since in application all 11,267 TAZs are in the choice set.

Estimation Results

Table 5-1 shows the final HBW estimation results. The coefficient on mode choice logsum was constrained to 0.9, because it was consistently estimated to be larger than 1.0 across several different specifications. The distance polynomial results in a monotonically decreasing utility. The distance disutility was capped at 50 miles, to avoid a very large negative coefficient on the linear term, and/or non-monotonic disutility specifications. Variables tested but ultimately dropped from the utility

specification due to illogical and/or insignificant coefficients include mixed density interacted with distance and household income interacted with distance. Interacting the mixed density variable with the intrazonal indicator also resulted in a counterintuitive relationship, and therefore the preferred specification is a pure intrazonal indicator variable.

Table 5-1: HBW Destination Choice Estimation Results

Explanatory Variable	HBWD		HBWS	
	Coefficient	t-Stat	Coefficient	t-Stat
Mode Choice Logsum	0.9	n/a	0.9	n/a
Distance	-0.10696	-42.3	-0.093875	-19.0
Distance Squared	0.00140870	19.3	0.0014159	8.4
Distance Cubed	-0.00000643	-11.8	-0.0000100	-6.5
Intra-Zonal Indicator	1.007	12.1	-0.052	-0.3
Observations	16,167(x20)	--	3,289(x20)	--
Final Log-Likelihood	-56666	--	-24144	--
Rho-Squared (Zero)	0.0986	--	0.0758	--
Rho-Squared (Constants)	0.0956	--	0.0736	--

Separate models were estimated for peak and off-peak period trips, but because the differences between them were small, the observations were pooled to estimate the final model. Observed time-of-day differences in average trip lengths were captured in the distance polynomial parameters during model calibration.

The final estimation results for the home-based non-work models are shown in Table 5-2. Overall similar relationships were observed as in the HBW models. In all cases the mode choice logsum coefficient was constrained because its estimated values were greater than 1.0. A value of 0.9 was chosen, similar to the value assumed for the HBW models. Higher density at the production zone end results in a higher likelihood of an intrazonal shopping trip.

The final estimation results for the non-home based models are shown in Table 5-3. No household attributes were explored since they cannot be used in model application. The distance decay and intrazonal effects are similar to those estimated for the home-based models.

Table 5-2: Home-Based Non-Work Destination Choice Estimation Results

Explanatory Variable	HBSH		HBSR		HBSP		HBO	
	Coefficient	t-Stat	Coefficient	t-Stat	Coefficient	t-Stat	Coefficient	t-Stat
Mode Choice Logsum	0.9	n/a	0.9	n/a	0.9	n/a	0.9	n/a
Distance	-0.39444	-69.0	-0.19760	-82.4	-0.51420	-73.2	-0.32393	-108.1
Distance Squared	0.006084	29.6	0.002263	41.7	0.010249	27.7	0.004846	49.2
Distance Cubed	-3.01E-05	-17.2	-0.75E-05	-25.2	-6.91E-05	-15.7	-2.26E-05	-28.8
Intra-Zonal Indicator	0.729	3.8						
Intra-Zonal * Density								
Low Density	0.556	1.9						
Medium Density	0.974	3.0						
High Density	1.819	5.6						
	--	--	--	--	--	--	--	--
Observations	16,706(x10)	--	11,538(x10)	--	8,841(x10)	--	18,430(x10)	--
Final Log-Likelihood	-17328	--	-353425	--	-16828	--	-43969	--
Rho-Squared (Zero)	0.407	--	0.194	--	0.508	--	0.342	--
Rho-Squared (Constants)	0.393	--	0.185	--	0.500	--	0.334	--

Table 5-3: Non-Home Based Destination Choice Estimation Results

Explanatory Variable	WBO		OBO	
	Coefficient	t-Stat	Coefficient	t-Stat
Mode Choice Logsum	0.9	n/a	0.9	n/a
Distance	-0.07764	-25.8	-0.15228	-92.8
Distance Squared	0.000491	15.0	0.000478	43.6
Distance Cubed	-0.24E-05	-6.9	-0.050E-05	n/a
Intra-Zonal Indicator	1.703	11.5	0.71129428	8.2
Intra-Zonal * Density				
Low Density	0.677	2.9	0.389	3.02
Medium Density	1.646	5.99	1.260	8.44
High Density	2.280	11.09	1.790	13.22
Observations	4,520(x10)	--	15,634(x10)	--
Final Log-Likelihood	-12915	--	--40160	--
Rho-Squared (Zero)	0.2497	--	0.3229	--
Rho-Squared (Constants)	0.242	--	0.314	--

Gravity Models (HBSC and HBCU Trip Purposes)

The gravity model is used to distribute HBSC and HBCU trips from origin zone to each destination zone in the region. It is based on Newton's law of gravity, which describes the gravitational force between two bodies. The number of trips between zones in transportation models is a function of the attractiveness of a zone and the travel impedance between zones:

$$T_{ij} = \frac{P_i * (A_j * F(I_{ij}) * K_{ij})}{\sum_j (A_j * F(I_{ij}) * K_{ij})}$$

where, Tij is the number of trips produced in zone i and attracted to zone j;
Pi is the number of trips produced in zone i;
Aj is the number of trips attracted to zone j;
Iij is a measure of impedance of travel from i to j;
F is a friction factor, which is a function of the impedance that represents the disutility of travel between i and j; and
Kij is the zone-to-zone adjustment factor, which takes into account the effect of undefined socioeconomic linkages not otherwise incorporated in the gravity model.

The gravity model in this application will apportion the trips produced at each production zone among attraction zones according to the attractiveness of each zone and the disutility of travel for each trip interchange. The SCAG gravity models are doubly constrained, which means that the program will iterate until the trips produced from and attracted to each zone are consistent with the trip productions and attractions forecasted in trip generation.

The friction factors for were derived by fitting the trip length frequency distributions to the observed HBSC and HBCU distributions for each time period (peak and off-peak). The basic formula for the friction factors is given by the gamma function below.

$$f(x) = ax^{-b}e^{-cx}$$

where a, b, and c are parameters to be calibrated, and x is the trip impedance.

Two exponential decay parameters (c parameter) were calibrated, to better match the tail of the trip length distribution. The calibrated gamma function parameters, and the travel time that corresponds to the change from c1 to c2 (curve inflection) are shown in Table 5-4.

Table 5-4: Trip Distribution Gamma Function Parameters by Time Period

Purpose	Time Period	Gamma a	Gamma b	Gamma c1	Gamma c2	Inflection (travel time)
HBSC	Peak	650,000	1.4352	0.2198	0.0276	15.00
	Off-peak	6,500,000	2.0889	0.2184	0.0192	13.00
HBCU	Peak	500,000	1.4066	0.1148	0.0681	15.00
	Off-peak	500,000	2.4734	0.1474	0.0580	15.00

Model Application and Calibration

In application the destination choice models are stratified by five trip markets, defined by car sufficiency and income levels. Since the mode choice models are similarly stratified, the mode choice logsums are matched at the trip market level.

During the calibration phase the estimated distance polynomials were modified to improve the fit of the estimated trip length distribution to the observed data. The calibration consisted of adjusting the distance disutility terms by comparing the estimated and observed trip lengths at one-mile increments. Several different measures of the fit of the model to the observed data were examined, including average trip length by trip purpose, time period and trip market level, average trip length by trip purpose market and density level, trip length distribution and coincidence ratio, ACS 5-year county-level worker flow patterns .

Below the county level, the only sources of trip flow data are the 2012 California household travel survey, and the CTPP ACS 2012 5-Year Release worker flow matrix.

Table 5-5 shows the validation of average trip lengths by trip purpose, time period and household market. The estimated trip length is typically within 10% of the observed trip length, except in a few cases where the observed values appear biased by small sample sizes in the observed data. In such instances the model was calibrated to exhibit a logical progression of average trip lengths across household markets. Table 5-5 also shows the coincidence ratio for each trip purpose, time period and market segment. The coincidence ratio is a measure of the goodness of fit of the calibrated trip length distribution compared to the observed trip length distribution.

Table 5-5: Trip Distance Validation

Purpose	Period	Household Segment	Number of Obs.	Average Distance (mi)			Coincidence Ratio
				Target	Estimated	Ratio	
HBWD	Peak	Zero	215	12.4	8.59	0.69	0.78
		Insuf	627	14.7	12.56	0.85	0.86
		Suf/Low	1,225	14.4	14.59	1.01	0.95
		Suf/Med	2,699	15.7	16.38	1.04	0.94
		Suf/Hi	5,948	17.4	17.32	1.00	0.93
	Off-Peak	Zero	136	11.1	7.94	0.71	0.80
		Insuf	407	13.5	12.10	0.90	0.88
		Suf/Low	988	13.2	12.44	0.95	0.88
		Suf/Med	1,592	14.5	14.12	0.98	0.87
		Suf/Hi	2,788	16.1	15.59	0.97	0.89
HBWS	Peak	Zero	7	10.5	7.78	0.74	0.83
		Insuf	111	14.3	12.49	0.87	0.85
		Suf/Low	210	16.3	13.87	0.85	0.87
		Suf/Med	515	15.4	15.19	0.98	0.89
		Suf/Hi	1,416	17.3	17.05	0.99	0.88
	Off-Peak	Zero	6	10.5	7.67	0.73	0.82
		Insuf	42	14.3	13.16	0.92	0.85
		Suf/Low	139	16.3	15.82	0.97	0.89
		Suf/Med	288	15.5	16.40	1.06	0.90
		Suf/Hi	564	17.3	17.19	0.99	0.85
HBSH	Peak	Zero	173	6.3	6.03	0.96	0.90
		Insuf	583	7.2	6.98	0.98	0.94
		Suf/Low	400	7.2	6.78	0.94	0.92
		Suf/Med	728	7.4	7.23	0.97	0.92
		Suf/Hi	1,323	7.5	7.35	0.98	0.90
	Off-Peak	Zero	274	6.5	6.30	0.97	0.91
		Insuf	912	7.4	6.92	0.94	0.91
		Suf/Low	791	7.4	7.28	0.99	0.87
		Suf/Med	1,351	7.6	7.48	0.98	0.87
		Suf/Hi	2,187	7.7	7.60	0.99	0.88

Purpose	Period	Household Segment	Number of Observations	Average Distance (mi)			Coincident Ratio
				Observed	Estimated	Ratio	
HBSR	Peak	Zero	147	10.1	9.92	0.98	0.89
		Insuf	702	12.4	12.48	1.01	0.90
		Suf/Low	545	12.7	13.00	1.02	0.89
		Suf/Med	1,127	13.2	13.19	1.00	0.89
		Suf/Hi	2,443	12.9	13.76	1.07	0.87
	Off-Peak	Zero	214	10.3	9.73	0.94	0.82
		Insuf	935	12.6	11.56	0.92	0.89
		Suf/Low	776	12.9	13.01	1.01	0.87
		Suf/Med	1,605	13.4	13.30	0.99	0.89
		Suf/Hi	3,582	13.1	13.58	1.04	0.87
HBSP	Peak	Zero	103	4.2	3.55	0.84	0.83
		Insuf	920	4.5	4.27	0.95	0.87
		Suf/Low	618	4.7	4.68	0.99	0.84
		Suf/Med	1,370	4.9	4.97	1.01	0.84
		Suf/Hi	2,623	5.1	5.32	1.04	0.86
	Off-Peak	Zero	65	4.4	3.48	0.79	0.81
		Insuf	557	4.7	4.05	0.87	0.82
		Suf/Low	435	4.9	4.50	0.92	0.80
		Suf/Med	795	5.1	5.11	1.00	0.80
		Suf/Hi	1,598	5.3	5.13	0.97	0.80
HBO	Peak	Zero	350	8.2	7.24	0.88	0.84
		Insuf	1,240	8.7	8.36	0.96	0.81
		Suf/Low	1,045	8.8	8.19	0.93	0.84
		Suf/Med	1,874	9.0	9.03	1.00	0.80
		Suf/Hi	4,122	9.1	9.41	1.03	0.82
	Off-Peak	Zero	473	8.5	7.54	0.89	0.87
		Insuf	1,411	9.0	9.03	1.01	0.81
		Suf/Low	1,406	9.1	10.36	1.14	0.80
		Suf/Med	2,442	9.3	9.69	1.04	0.81
		Suf/Hi	4,637	9.4	9.76	1.04	0.82
WBO	Peak	All	1,434	9.7	9.58	0.99	0.85
	Off-Peak	All	3,474	8.3	8.54	1.03	0.89
OBO	Peak	All	6,940	7.4	7.09	0.96	0.91
	Off-Peak	All	10,348	7.4	7.41	1.00	0.93
HBCU	Peak	All	456	11.9	12.54	1.05	0.76
	Off-Peak	All	564	13.0	12.45	0.96	0.51
HBSC	Peak	All	3,986	3.8	3.74	0.99	0.76
	Off-Peak	All	1,442	3.6	3.52	0.99	0.73

(1) *See Table 3-12 for the household market segments definitions*

Table 5-6 shows the validation of the estimated 2012 county-to-county HBW trip flows. Note that the ACS data show worker flows, not trip flows. Figures 5-1 to 5-8 show a comparison of observed and estimated trip length frequency distributions for each trip purpose. The observed trip lengths were obtained from the most recent region-wide household survey, conducted in 2012.

Table 5-6: County-To-County HBW Trip Validation

Worker Flows, 2008-2012 ACS								
	County	**25**	**37**	**59**	**65**	**71**	**111**	**SCAG**
25	Imperial	51,070	123	58	1,235	100	10	52,596
37	Los Angeles	197	4,049,070	180,799	15,160	57,039	36,538	4,338,803
59	Orange	25	178,031	1,178,730	15,171	12,110	534	1,384,601
65	Riverside	654	50,875	66,986	585,391	89,406	578	793,890
71	San Bernardino	100	126,465	34,918	64,978	569,504	831	796,796
111	Ventura	25	66,683	1,174	237	439	294,158	362,716
	SCAG Region	**52,071**	**4,471,247**	**1,462,665**	**682,172**	**728,598**	**332,649**	**7,729,402**
HBW Trips, 2012 Model Estimate								
	County	**25**	**37**	**59**	**65**	**71**	**111**	**SCAG**
25	Imperial	77,255	321	246	2,573	274	7	80,677
37	Los Angeles	21	5,502,212	475,992	29,761	105,550	76,668	6,190,204
59	Orange	9	384,405	1,547,114	29,877	34,822	1,533	1,997,761
65	Riverside	1,697	131,892	168,017	723,570	182,331	1,143	1,208,650
71	San Bernardino	208	248,195	109,272	119,542	668,743	2,405	1,148,365
111	Ventura	1	160,854	4,031	332	988	368,364	534,570
	SCAG Region	**79,191**	**6,427,879**	**2,304,673**	**905,655**	**992,708**	**450,120**	**11,160,227**
Forecast Difference (%), Trips vs. Worker Flow, County Normalized								
	County	**25**	**37**	**59**	**65**	**71**	**111**	**SCAG**
25	Imperial	-1.3%	0.2%	0.2%	0.8%	0.1%	0.0%	0.0%
37	Los Angeles	0.0%	-4.4%	3.5%	0.1%	0.4%	0.4%	0.0%
59	Orange	0.0%	6.4%	-7.7%	0.4%	0.9%	0.0%	0.0%
65	Riverside	0.1%	4.5%	5.5%	-13.9%	3.8%	0.0%	0.0%
71	San Bernardino	0.0%	5.7%	5.1%	2.3%	-13.2%	0.1%	0.0%
111	Ventura	0.0%	11.7%	0.4%	0.0%	0.1%	-12.2%	0.0%
	SCAG Region	**0.0%**	**-0.3%**	**1.7%**	**-0.7%**	**-0.5%**	**-0.3%**	**0.0%**

Table 5-7: Sub Air Basin To County HBW Trip Validation

Worker Flows, 2008-2012 ACS							
Sub Air Basin	**Imperial**	**Los Angeles**	**Orange**	**Riverside**	**San Bernardino**	**Ventura**	**SCAG**
SCCAB (VENTURA COUNTY)	25	66683	1174	237	439	294158	362,716
SCAB (LOS ANGELES COUNTY)	197	3,927,389	180,183	14,943	55,685	35,216	4,213,613
MDAB (ANTELOPE VALLEY)	25	178,031	1,178,730	15,171	12,110	534	1,384,601
SCAB (ORANGE COUNTY)	233	47,652	65,357	429,554	86,634	363	629,793
SCAB (RIVERSIDE COUNTY)	60	114,887	32,196	55,712	420,546	627	624,028
MDAB (RIV DESERT)	0	121,681	616	217	1,354	1,322	125,190
MDAB (BLYTHE)	40	11,528	2,687	9,182	142,146	204	165,787
SSAB (COACHELLA VALLEY)	0	0	0	0	524	0	524
SCAB (SAN BERNARDINO CO)	0	50	35	84	6,288	0	6,457
MDAB (VICTOR VALLEY)	0	35	0	662	34	0	731
MDAB (SBD DESERT)	4	10	10	5,111	50	0	5,185
MDAB (SEALES VALLEY)	417	3,178	1,619	150,064	2,688	215	158,181
SSAB (IMPERIAL	3119	0	0	763	0	0	3,882

/WEST)							
SSAB (IMPERIAL /EAST)	575	0	0	60	0	0	635
SSAB (IMPERIAL PM2.5 NON-ATT)	47,376	123	58	412	100	10	48,079
SCAG Region	**52,071**	**4,471,247**	**1,462,665**	**682,172**	**728,598**	**332,649**	**7,729,402**
HBW Trips, 2012 Model Estimate							
Sub Air Basin	**Imperial**	**Los Angeles**	**Orange**	**Riverside**	**San Bernardino**	**Ventura**	**SCAG**
SCCAB (VENTURA COUNTY)	1	157,624	3,915	331	984	340,681	503,536
SCAB (LOS ANGELES COUNTY)	18	4,571,326	459,212	28,418	98,205	67,744	5,224,923
MDAB (ANTELOPE VALLEY)	9	373,861	1,422,327	29,620	34,762	1,505	1,862,083
SCAB (ORANGE COUNTY)	167	124,384	162,089	476,036	174,584	1,039	938,298
SCAB (RIVERSIDE COUNTY)	65	202,149	90,496	99,463	464,789	1,506	858,468
MDAB (RIV DESERT)	3	170,901	3,553	1,177	5,263	4,829	185,726
MDAB (BLYTHE)	84	38,538	17,843	19,445	159,510	891	236,312
SSAB (COACHELLA VALLEY)	0	26	13	6	439	1	485
SCAB (SAN BERNARDINO CO)	59	74	49	286	3,047	2	3,518
MDAB (VICTOR VALLEY)	39	88	74	642	52	2	897
MDAB	460	130	98	6,855	133	3	7,679

(SBD DESERT)							
MDAB (SEALES VALLEY)	1,032	5,056	4,360	195,055	7,214	98	212,813
SSAB (IMPERIAL /WEST)	3,782	193	163	1,805	151	4	6,099
SSAB (IMPERIAL /EAST)	1,150	5	4	61	6	0	1,226
SSAB (IMPERIAL PM2.5 NON-ATT)	64,580	122	79	707	117	3	65,608
SCAG Region	**71,448**	**5,644,478**	**2,164,274**	**859,907**	**949,256**	**418,308**	**10,107,670**

Forecast Difference (%), Trips vs. Worker Flow, Normalized

Sub Air Basin	Imperial	Los Angeles	Orange	Riverside	San Bernardino	Ventura	SCAG
SCCAB (VENTURA COUNTY)	0.0%	12.9%	0.5%	0.0%	0.1%	-13.4%	0.0%
SCAB (LOS ANGELES COUNTY)	0.0%	-5.7%	4.5%	0.2%	0.6%	0.5%	0.0%
MDAB (ANTELOPE VALLEY)	0.0%	7.2%	-8.7%	0.5%	1.0%	0.0%	0.0%
SCAB (ORANGE COUNTY)	0.0%	5.7%	6.9%	-17.5%	4.9%	0.1%	0.0%
SCAB (RIVERSIDE COUNTY)	0.0%	5.1%	5.4%	2.7%	-13.3%	0.1%	0.0%
MDAB (RIV DESERT)	0.0%	-5.2%	1.4%	0.5%	1.8%	1.5%	0.0%
MDAB (BLYTHE)	0.0%	9.4%	5.9%	2.7%	-18.2%	0.3%	0.0%
SSAB (COACHELLA VALLEY)	0.0%	5.4%	2.6%	1.2%	-9.4%	0.3%	0.0%
SCAB	1.7%	1.3%	0.9%	6.8%	-10.8%	0.1%	0.0%

(SAN BERNARDINO CO)							
MDAB (VICTOR VALLEY)	4.3%	5.0%	8.2%	-19.0%	1.1%	0.3%	0.0%
MDAB (SBD DESERT)	5.9%	1.5%	1.1%	-9.3%	0.8%	0.0%	0.0%
MDAB (SEALES VALLEY)	0.2%	0.4%	1.0%	-3.2%	1.7%	-0.1%	0.0%
SSAB (IMPERIAL /WEST)	-18.3%	3.2%	2.7%	9.9%	2.5%	0.1%	0.0%
SSAB (IMPERIAL /EAST)	3.2%	0.4%	0.3%	-4.5%	0.5%	0.0%	0.0%
SSAB (IMPERIAL PM2.5 NON-ATT)	-0.1%	-0.1%	0.0%	0.2%	0.0%	0.0%	0.0%
SCAG Region	**0.0%**	**-2.0%**	**2.5%**	**-0.3%**	**0.0%**	**-0.2%**	**0.0%**

Figure 5-1: HBWD Trip Length Validation

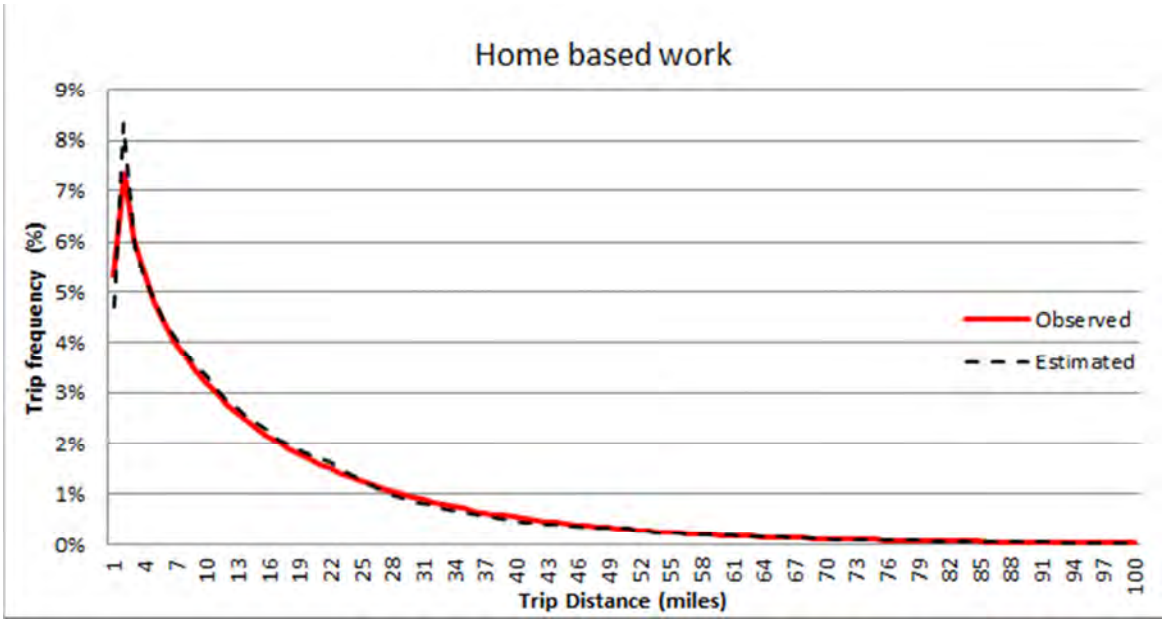


Figure 5-2: HBSH Trip Length Validation

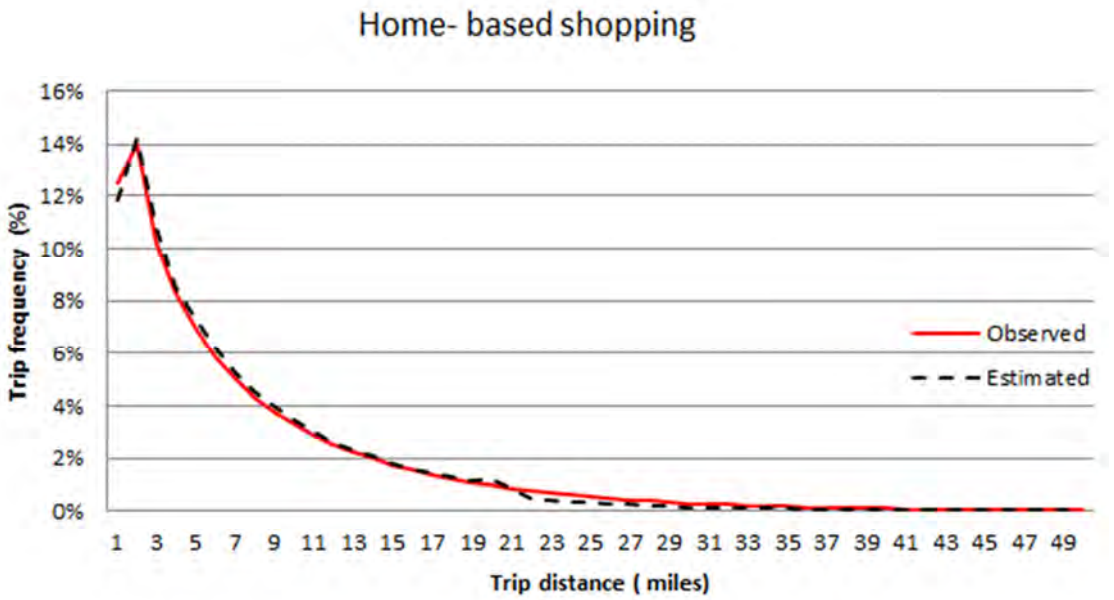


Figure 5-3: HBSR Trip Length Validation

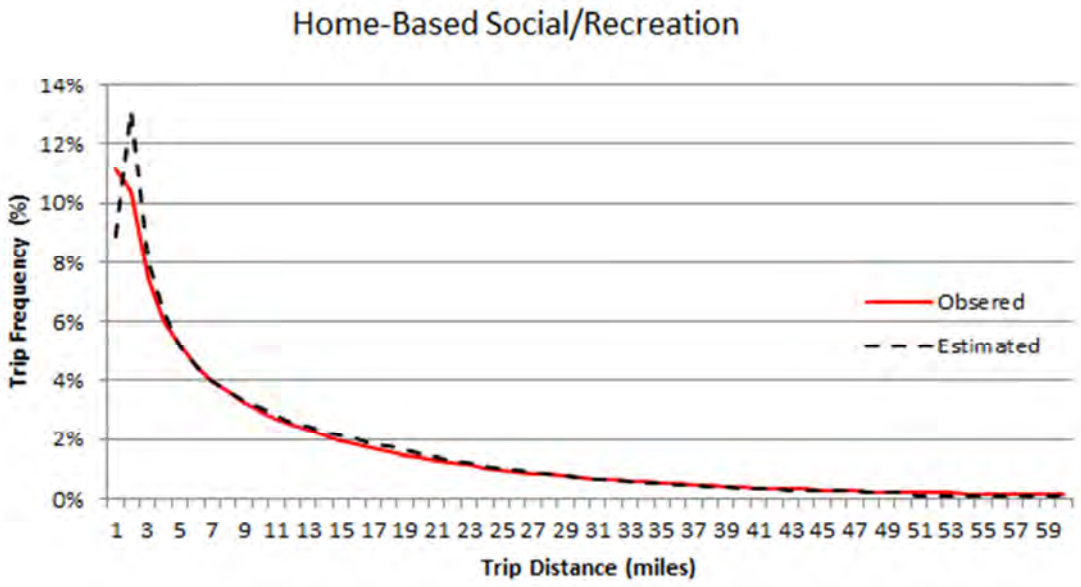


Figure 5-4: HBSP Trip Length Validation

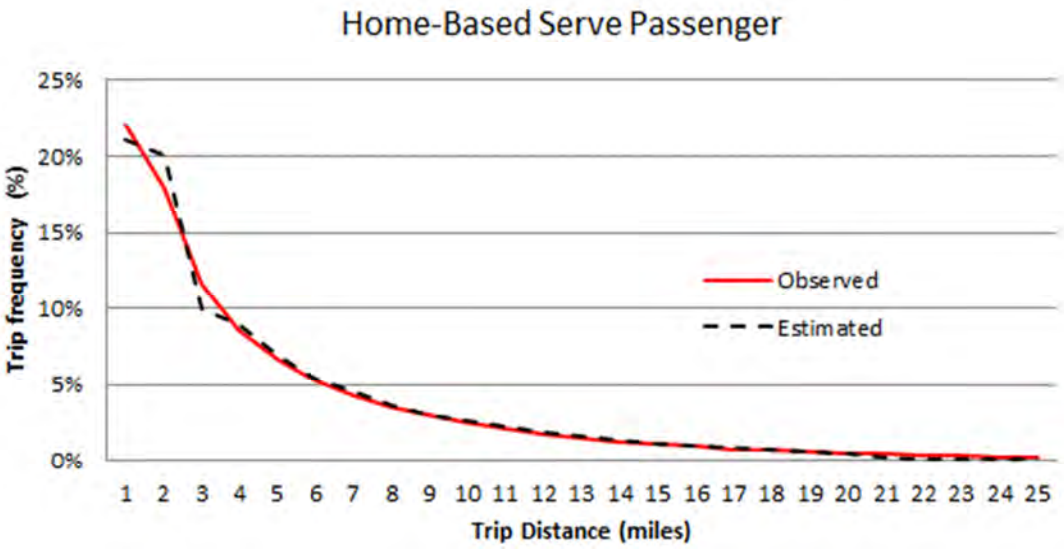


Figure 5-5: HBO Trip Length Validation

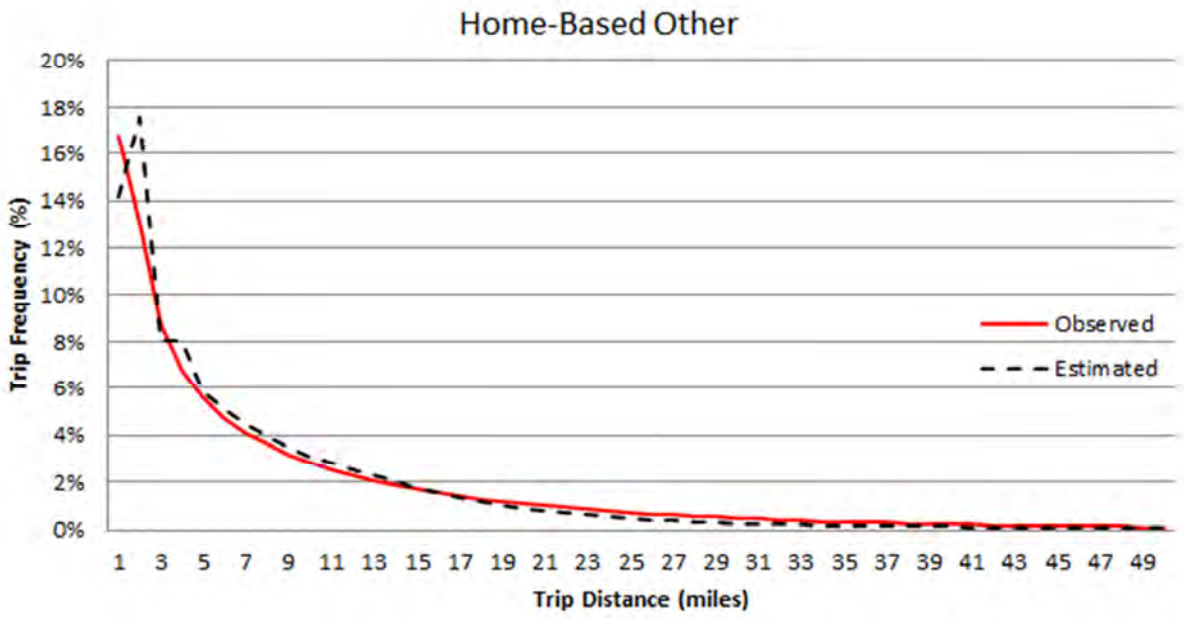


Figure 5-6: WBO Trip Length Validation

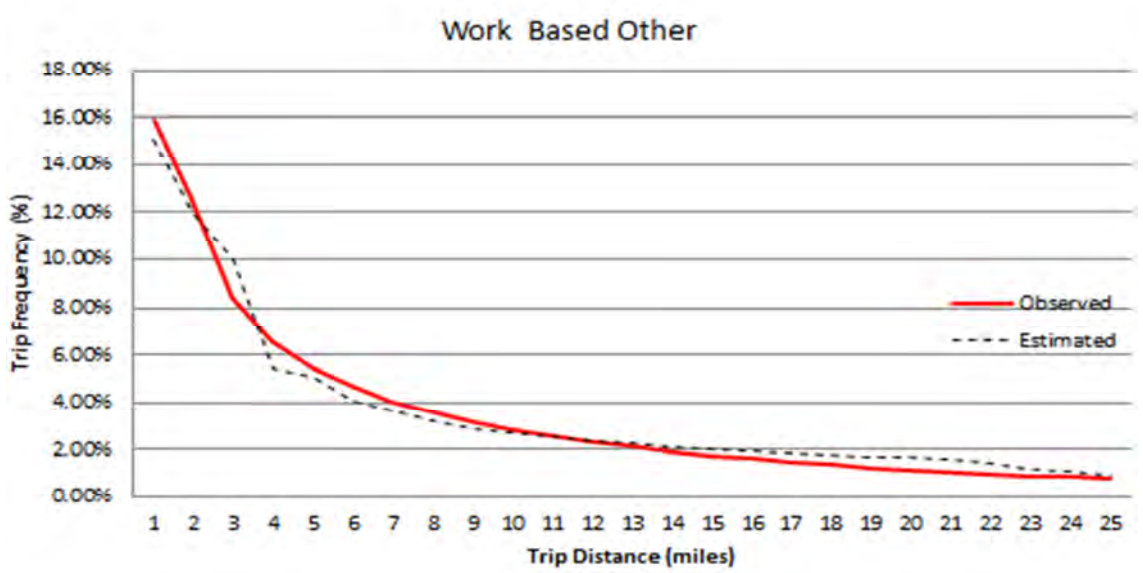


Figure 5-7: OBO Trip Length Validation

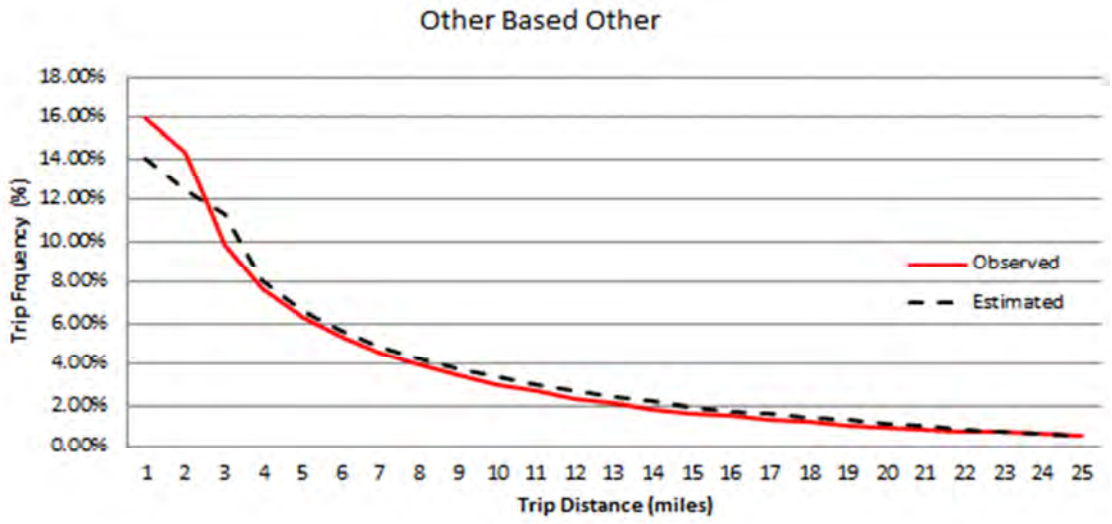
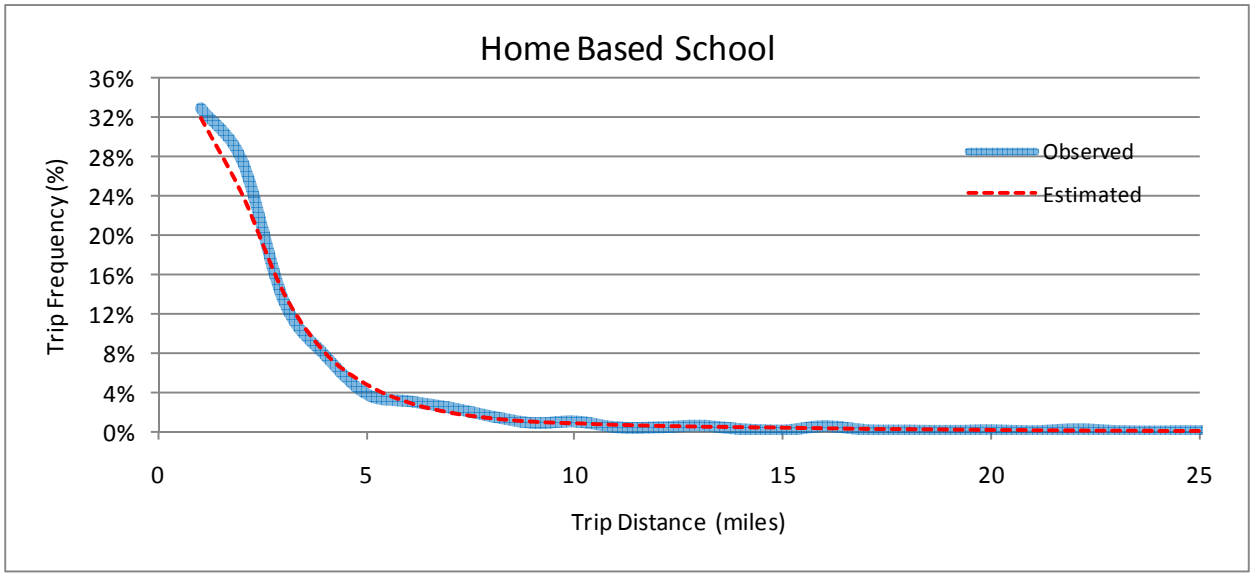


Figure 5-8: HBSC Trip Length Validation



Trip Distribution Model Results

Table 5-8: Year 2012 Home-Based Work Person Trip Distribution

From\To	Imperial	Los Angeles	Orange	Riverside	San Bernardino	Ventura	Total Productions
Imperial	**77,255** ***95.76%***	321 *0.40%*	246 *0.31%*	2,573 *3.19%*	274 *0.34%*	7.33 *0.01%*	80,677 *0.72%*
Los Angeles	21 *0.00%*	**5,502,212** ***88.89%***	475,992 *7.69%*	29,761 *0.48%*	105,550 *1.71%*	76,668 *1.24%*	6,190,204 *55.47%*
Orange	9 *0.00%*	384,405 *19.24%*	**1,547,114** ***77.44%***	29,877 *1.50%*	34,822 *1.74%*	1,533 *0.08%*	1,997,761 *17.90%*
Riverside	1,697 *0.14%*	131,892 *10.91%*	168,017 *13.90%*	**723,570** ***59.87%***	182,331 *15.09%*	1,143 *0.09%*	1,208,650 *10.83%*
San Bernardino	208 *0.02%*	248,195 *21.61%*	109,272 *9.52%*	119,542 *10.41%*	**668,743** ***58.23%***	2,405 *0.21%*	1,148,365 *10.29%*
Ventura	1 *0.00%*	160,854 *30.09%*	4,031 *0.75%*	332 *0.06%*	988 *0.18%*	**368,364** ***68.91%***	534,570 *4.79%*
Total Attractions	**79,191** **0.71%**	**6,427,879** **57.60%**	**2,304,673** **20.65%**	**905,655** **8.12%**	**992,708** **8.90%**	**450,120** **4.03%**	**11,160,227** **100.00%**

Note: Shares displayed represent the distribution of attraction locations for residents of each county.

Table 5-9: Home-Based Work Person Trip Distribution (ACS*, Travel Survey and Model)

From\To	Source	Imperial	Los Angeles	Orange	Riverside	San Bernardino	Ventura
Imperial	ACS (2006-2010)	97.10%	0.20%	0.10%	2.30%	0.20%	0.00%
	Travel Survey (2012)	94.27%	2.03%	1.52%	2.19%	0.00%	0.00%
	Model (2012)	95.76%	0.40%	0.31%	3.19%	0.34%	0.01%
Los Angeles	ACS (2006-2010)	0.00%	93.30%	4.20%	0.30%	1.30%	0.80%
	Travel Survey (2012)	0.03%	90.23%	4.85%	0.79%	2.32%	1.78%
	Model (2012)	0.00%	88.89%	7.69%	0.48%	1.71%	1.24%
Orange	ACS (2006-2010)	0.00%	12.90%	85.10%	1.10%	0.90%	0.00%
	Travel Survey (2012)	0.07%	14.38%	79.78%	3.93%	1.81%	0.03%
	Model (2012)	0.00%	19.24%	77.44%	1.50%	1.74%	0.08%
Riverside	ACS (2006-2010)	0.10%	6.40%	8.40%	73.70%	11.30%	0.10%
	Travel Survey (2012)	0.13%	5.03%	7.75%	73.90%	13.12%	0.08%
	Model (2012)	0.14%	10.91%	13.90%	59.87%	15.09%	0.09%

San Bernardino	ACS (2006-2010)	0.00%	15.90%	4.40%	8.20%	71.50%	0.10%
	Travel Survey (2012)	0.00%	14.85%	3.53%	11.23%	70.00%	0.39%
	Model (2012)	0.02%	21.61%	9.52%	10.41%	58.23%	0.21%
Ventura	ACS (2006-2010)	0.00%	18.40%	0.30%	0.10%	0.10%	81.10%
	Travel Survey (2012)	0.00%	23.27%	0.14%	0.13%	0.00%	76.46%
	Model (2012)	0.00%	30.09%	0.75%	0.06%	0.18%	68.91%
SCAG Region	ACS (2006-2010)	**0.70%**	**57.80%**	**18.90%**	**8.80%**	**9.40%**	**4.30%**
	Travel Survey (2012)	**0.86%**	**56.95%**	**19.05%**	**8.98%**	**9.59%**	**4.56%**
	Model (2012)	**0.71%**	**57.60%**	**20.65%**	**8.12%**	**8.90%**	**4.03%**

(*) American Community Survey 2006-2010 Release

Table 5-10: Year 2012 Home-Based Non-Work Person Trip Distribution

From\To	Imperial	Los Angeles	Orange	Riverside	San Bernardino	Ventura	Total Productions
Imperial	**299,423** ***96.42%***	**2,272** *0.73%*	**1,006** *0.32%*	**5,936** *1.91%*	**1,778** *0.57%*	**113** *0.04%*	310,528 *0.90%*
Los Angeles	823 *0.00%*	**17,393,491** ***94.26%***	593,074 *3.21%*	86,681 *0.47%*	265,268 *1.44%*	113,605 *0.62%*	18,452,942 *53.59%*
Orange	235 *0.00%*	587,624 *10.20%*	**5,050,109** ***87.68%***	67,965 *1.18%*	48,017 *0.83%*	5,541 *0.10%*	5,759,491 *16.72%*
Riverside	3,199 *0.07%*	114,497 *2.66%*	75,422 *1.75%*	**3,842,552** ***89.16%***	269,703 *6.26%*	4,305 *0.10%*	4,309,679 *12.51%*
San Bernardino	704 *0.02%*	271,064 *6.76%*	63,729 *1.59%*	276,647 *6.90%*	**3,391,855** ***84.59%***	5,793 *0.14%*	4,009,794 *11.64%*
Ventura	89 *0.01%*	165,427 *10.38%*	7,921 *0.50%*	4,167 *0.26%*	5,463 *0.34%*	**1,411,174** ***88.52%***	1,594,242 *4.63%*
Total Attractions	**304,474** **0.88%**	**18,534,377** **53.82%**	**5,791,262** **16.82%**	**4,283,949** **12.44%**	**3,982,084** **11.56%**	**1,540,530** **4.47%**	**34,436,676** **100.00%**

Note: Shares displayed represent the distribution of attraction locations for residents of each county.

Table 5-11: Year 2012 Non-Home Based Person Trip Distribution

From\To	Imperial	Los Angeles	Orange	Riverside	San Bernardino	Ventura	Total Productions
Imperial	**100,639** ***98.65%***	**31** *0.03%*	**23** *0.02%*	**1,282** *1.26%*	**42** *0.04%*	**0** *0.00%*	102,017 *0.57%*
Los Angeles	1 *0.00%*	**9,496,284** ***94.42%***	383,076 *3.81%*	14,893 *0.15%*	104,404 *1.04%*	58,316 *0.58%*	10,056,974 *56.54%*
Orange	1 *0.00%*	407,804 *11.97%*	**2,952,331** ***86.65%***	24,132 *0.71%*	22,790 *0.67%*	291 *0.01%*	3,407,347 *19.16%*
Riverside	120 *0.01%*	26,427 *1.52%*	33,868 *1.95%*	**1,534,874** ***88.29%***	143,094 *8.23%*	91 *0.01%*	1,738,474 *9.77%*
San Bernardino	8 *0.00%*	130,267 *7.67%*	27,437 *1.62%*	125,674 *7.40%*	**1,414,137** ***83.30%***	213 *0.01%*	1,697,735 *9.54%*
Ventura	0 *0.00%*	80,955 *10.31%*	692 *0.09%*	92 *0.01%*	236 *0.03%*	**703,225** ***89.56%***	785,200 *4.41%*
Total Attractions	**100,769** **0.88%**	**10,141,767** **53.82%**	**3,397,425** **16.82%**	**1,700,947** **12.44%**	**1,684,703** **11.56%**	**762,136** **4.47%**	**17,787,747** **100.00%**

Note: Shares displayed represent the distribution of attraction locations for residents of each county.

Table 5-12: Year 2012 Total Person Trip Distribution

From\To	Imperial	Los Angeles	Orange	Riverside	San Bernardino	Ventura	Total Productions
Imperial	**477,318** ***96.78%***	**2,624** *0.53%*	**1,275** *0.26%*	**9,791** *1.99%*	**2,094** *0.42%*	**120** *0.02%*	493,222 *0.78%*
Los Angeles	845 *0.00%*	**32,391,986** ***93.35%***	1,452,142 *4.18%*	131,335 *0.38%*	475,222 *1.37%*	248,589 *0.72%*	34,700,119 *54.75%*
Orange	245 *0.00%*	1,379,833 *12.36%*	**9,549,553** ***85.53%***	121,974 *1.09%*	105,629 *0.95%*	7,365 *0.07%*	11,164,599 *17.61%*
Riverside	5,017 *0.07%*	272,816 *3.76%*	277,307 *3.82%*	**6,100,996** ***84.07%***	595,129 *8.20%*	5,538 *0.08%*	7,256,804 *11.45%*
San Bernardino	920 *0.01%*	649,526 *9.47%*	200,439 *2.92%*	521,863 *7.61%*	**5,474,735** ***79.85%***	8,410 *0.12%*	6,855,893 *10.82%*
Ventura	90 *0.00%*	407,237 *13.98%*	12,645 *0.43%*	4,591 *0.16%*	6,687 *0.23%*	**2,482,763** ***85.20%***	2,914,012 *4.60%*
Total Attractions	**484,435** **0.76%**	**35,104,022** **55.38%**	**11,493,360** **18.13%**	**6,890,550** **10.87%**	**6,659,496** **10.51%**	**2,752,786** **4.34%**	**63,384,649** **100.00%**

Note: Shares displayed represent the distribution of attraction locations for residents of each county.

Table 5-13: Year 2012 Average Person Trip Lengths by County

AM-Peak Period:

County	Trip Purpose	Home-Based Work	Home-Based Non-Work	Home-Based School	Non-Home Based Others
Imperial	Time (minutes) Distance (miles)	14.11 11.17	9.97 7.49	5.01 3.37	5.93 3.96
Los Angeles	Time Distance	27.57 13.69	16.83 8.09	7.96 4.00	15.92 7.57
Orange	Time Distance	24.04 13.31	15.01 8.13	6.48 3.46	13.86 7.49
Riverside	Time Distance	41.21 24.10	15.95 9.45	8.64 5.49	12.45 7.13
San Bernardino	Time Distance	41.27 23.78	16.28 9.68	8.76 5.67	13.45 7.70
Ventura	Time Distance	29.32 17.05	14.80 8.60	6.51 3.80	10.46 6.10
All	**Time (min)** **Distance (mi)**	**29.81** **15.93**	**16.20** **8.47**	**7.82** **4.32**	**14.65** **7.44**

Table 5-13: Year 2012 Average Person Trip Lengths by County (continued)

Midday Period:

County	Trip Purpose	Home-Based Work	Home-Based Non-Work	Home-Based School	Non-Home Based Others
Imperial	Time (minutes)	13.45	11.83	12.55	5.94
	Distance (miles)	10.65	9.52	10.77	3.96
Los Angeles	Time	21.90	15.43	8.46	14.52
	Distance	12.55	8.54	4.97	7.72
Orange	Time	19.60	14.33	6.74	12.82
	Distance	12.26	8.69	3.97	7.64
Riverside	Time	29.85	15.51	12.49	11.55
	Distance	21.80	10.85	9.38	7.51
San Bernardino	Time	29.13	15.77	10.83	12.37
	Distance	21.89	11.09	7.78	8.16
Ventura	Time	22.07	14.28	10.30	9.86
	Distance	15.47	9.69	7.31	6.43
All	**Time (min)**	**23.04**	**15.21**	**9.13**	**13.44**
	Distance (mi)	**14.58**	**9.21**	**5.90**	**7.65**

Total Daily:

County	Trip Purpose	Home-Based Work	Home-Based Non-Work	Home-Based School	Non-Home Based Others
Imperial	Time (minutes)	13.88	10.95	7.24	5.94
	Distance (miles)	10.99	8.56	5.56	3.96
Los Angeles	Time	25.56	16.07	8.12	15.07
	Distance	13.28	8.34	4.30	7.66
Orange	Time	22.47	14.64	6.56	13.23
	Distance	12.94	8.44	3.62	7.58
Riverside	Time	37.21	15.71	9.80	11.91
	Distance	23.29	10.21	6.67	7.36
San Bernardino	Time	36.96	16.00	9.39	12.80
	Distance	23.11	10.45	6.31	7.98
Ventura	Time	26.75	14.52	7.68	10.10
	Distance	16.49	9.20	4.88	6.30
All	**Time (min)**	**27.41**	**15.66**	**8.23**	**13.92**
	Distance (mi)	**15.45**	**8.87**	**4.81**	**7.56**

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Chapter 6 – Mode Choice

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Chapter 6 – Mode Choice

Introduction

Mode choice is the process of taking the zone-to-zone person trips by trip purpose from the trip distribution model and determining how many of those person-trips are made by the various travel modes: non-motorized modes (walk and bike), auto modes (driver alone or carpool), and transit modes (drive or walk access and drive or walk egress). The 2012 model incorporates a redefined and recalibrated mode choice model for the region.

This Chapter describes the development of the updated mode choice model. The various travel modes estimated by the model are also summarized and explained.

Model Specification

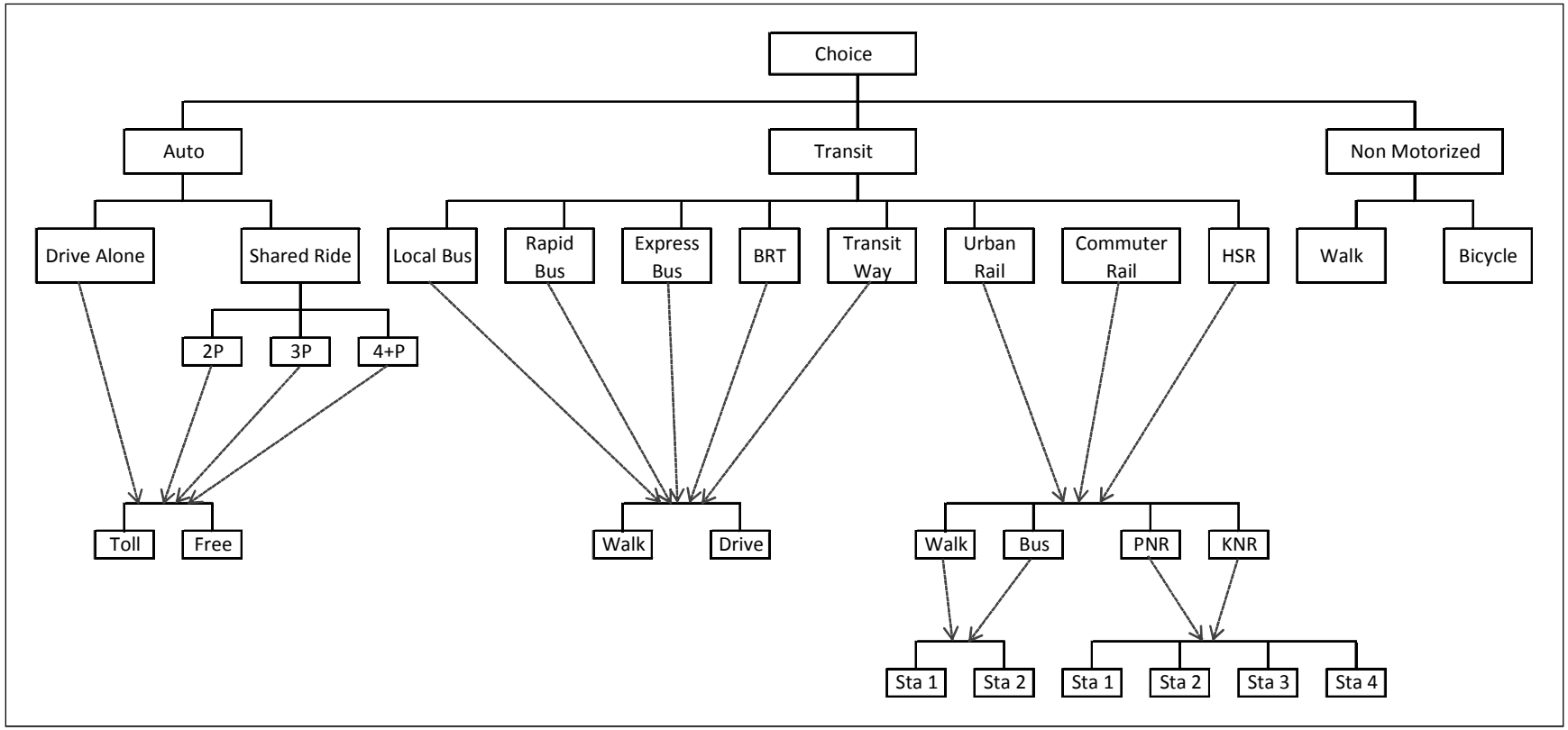
Elemental Choices

The SCAG mode choice model is a nested logit model, structured as shown in Figure 6-1. Among the auto choices, the model distinguishes four levels of occupancy (1, 2, 3 and 4 persons per vehicle) and includes a pre-route toll/no toll binary choice. Although not shown Figure 6-1, the model includes a HOV/non-HOV path subnest for the shared-ride choices. This model and the toll choice model may be used in lieu of the assignment-based diversion models, at the user's request. Currently the region includes over 400 centerline miles of HOV lanes restricted to 2+ person carpools, one 10-mile facility restricted to 3+ person carpools, and several toll facilities including two HOT lane facilities nearing full implementation.

The Southern California region comprises a wide variety of transit markets, ranging from the traditional transit-captive local bus market to choice travelers on the long distance commuter rail market. By 2040, it is expected that high-speed rail service will connect the region's main airports as well as serve Union Station and other cities in the region as part of the San Francisco-to-San Diego statewide line. The principal provider of transit services in the region is LACTMA, which operates a variety of transit technologies and services—local, limited stop (rapid) and express buses, bus rapid transit on a dedicated guideway, and urban rail (underground, at-grade and elevated lines). Two transitways, the El Monte Busway and the Harbor (I-110) Freeway HOV lanes separate express buses from the general purpose freeway traffic. The Harbor HOV facility provides elevated stations for fast boarding and alighting.

Commuter rail service is provided by Metrolink, and to a lesser extent Amtrak. Metrolink trains provide frequent peak period service from North Los Angeles, San Bernardino and Riverside into Los Angeles and Orange counties. Nearly 60 other transit agencies provide local and/or regional express bus services in the 6-county region, ranging from large fleets such as the Orange County Transportation Agency, Foothill Transit and the City of Los Angeles, to small city-run fleets. The elemental transit choices in the mode choice model have been defined to represent this wide variety of transit services, recognizing that for several markets these modes provide a competitive choice. In consultation with FTA, eight transit choices were defined on the basis of level of service characteristics and un-included mode attributes.

Figure 6-1: SCAG Mode Choice Model Nest Structure



Relative to local bus, key features considered in the definition of the transit modes include:

- Express bus: limited stop and limited span of service operating partly in mixed-flow freeway traffic
- Rapid bus: limited stops, more frequent service than express, distinctive branding; usually does not operate on freeways
- Transitway bus: limited stop service operating on semi-dedicated right of way (busway, HOV lanes)
- Bus Rapid Transit: limited stops, dedicated guideway, distinctive branding and vehicles
- Local (Urban) Rail: fixed-guideway transit (subways and light rail)
- Commuter Rail: fixed-guideway, long-distance rail, distinctive branding and vehicles, mostly commute market
- High Speed Rail: fixed-guideway, long-distance, distinctive branding and stops, commute and non-commute markets

Another feature of the SCAG mode choice model is the explicit modeling of station choice for all the rail modes. Station choice is modeled conditional on access mode. Rather than rely on the transit path builder to find the best combination of boarding and alighting stations, the mode choice model performs 'virtual' or 'on-the-fly' path building, explicitly trading off longer origin-to-station and/or station-to-destination paths with shorter station-to-station options (or vice-versa). For drive access, the model identifies the 10 best boarding stations and the 10 best alighting stations for a given origin-destination (OD) pair, considering the entire transit path utility. Of these, the top four stations become the drive-to-rail choice set for the station choice nest. OD trips are therefore distributed among all possible paths formed by the four access stations and four egress stations on the basis of their likelihoods. For walk and bus access trips, up to five boarding/alighting station combinations are identified, and the best two become part of the rail choice set. This specification of twelve stations (across the four access modes) for the choice set is a result of balancing the desire to capture the variations in travel behavior with the need to keep the computation time to a reasonable level.

The transit access and egress modes allowed for each primary transit mode are listed in Table 6-1. The commuter rail drive egress mode is unique to Southern California, where people keep a 'station' car at some Metrolink stations to drive to their final destination. Drive egress is also allowed for high-speed rail, since pick-up/drop-off and taxi patronage at the attraction station is likely to occur.

Table 6-1: Transit Access and Egress Modes

Primary Transit Mode	Access Modes						Egress Modes		
	Walk	Drive	Bus	PNR	KNR		Walk	Drive	Bus
Bus Modes	X	X					X		
Bus Rapid Transit	X	X	X				X		
Urban Rail	X		X	X	X		X		X
Commuter Rail	X		X	X	X		X	X	X
High Speed Rail	X		X	X	X		X	X	X

Note: PNR – Park-and-Ride, KNR – Kiss-and-Ride

Highway Path Building

A generalized cost function is used to build the highway travel time and cost matrices (skims). Up to eight different sets of skims are built for the mode choice model, one for each highway mode and time

period combination. For each of these combinations, best path skims are built for the toll, no-toll and HOV paths, as appropriate.

$$GC_{ij} = Travel\ Time_{ij} + \left(AOC \times Distance_{ij} + Toll_{ij}\right)/VOT$$

The auto operating cost (AOC) is $0.27 per mile (in $2011), and the value of time (VOT) is $9.84 per hour.

Transit Path Building

Transit walk access paths are built using TransCAD's Pathfinder algorithm for each mode in the choice set. The model builds transit paths among an expanded set of transit origins and destinations, comprised of the TAZ centroids, rail stations and bus park-n-ride locations. The skims for the local bus and rapid bus modes are built in the usual zone-to-zone fashion. The skims for the express bus, transitway bus, BRT and the rail modes are built between zones and stations. The skim building process and method used to construct the entire path is described below, under Virtual Path Building.

A hierarchy of transit modes is assumed to identify the primary mode of a multimodal transit trip. At the bottom of the hierarchy is local bus; a local bus trip boards only local bus modes. At the top of the hierarchy is high-speed rail; a multimodal trip that includes at least one leg on high-speed rail modes is assumed to be a high-speed rail trip. The priority order of the transit modes and corresponding supporting modes are shown in Table 6-2.

Table 6-2: Primary and Support Transit Modes

Primary Transit Mode	Support Transit Mode(s)
Local Bus	None
Express Bus	Local, Rapid Bus
Rapid Bus	Local Bus
Transitway Bus	Local, Express, Rapid Bus
Bus Rapid Transit	Local, Rapid Bus, Express Bus
Local (Urban) Rail	Local, Express, Rapid, Transitway Bus and BRT
Commuter Rail	Local, Express, Rapid, Transitway Bus, BRT and Urban Rail
High Speed Rail	Local, Express, Rapid, Transitway Bus, BRT, Urban and Commuter Rail

For each primary mode, only the supporting modes are allowed when building its paths and skims. The path attributes and weights used to compute the generalized cost function are shown in Table 6-3. These weights are approximately consistent with the value of the HBW mode choice wait time and walk access time coefficients relative to the in-vehicle time coefficient. Travel time on the primary mode is always given a weight of 1.0, while travel time on the transit supporting modes is given a weight of 1.5. The exception is Rapid Bus; the local bus travel time is weighted only 1.1 when building Rapid Bus paths. All walk times (access, egress and transfer) are given a weight of 2.0, and similarly the wait time is weighted by 2.0.

Table 6-3: Transit Path Building Weights

Transit Mode	Run Time Factor		Wait Time Factor
	Primary Mode	Support Mode	
Walk access, egress, transfer	-	2.0	-
Local Bus	1.0	1.5 (1.1)	2.0
Rapid Bus	1.0	1.5	2.0
Express Bus, Transitway	1.0	1.5	2.0
BRT	1.0	1.5	2.0
Urban Rail	1.0	1.5	2.0
Commuter Rail	1.0	1.5	2.0
High-Speed Rail	1.0	1.5	2.0

Virtual Transit Path Building

The skims for the premium bus modes and for the rail modes are built to support the station choice nest of the mode choice model. For this reason, , the entire origin zone to destination zone path is broken into two or three parts-- zone to station, station to station, and station to zone for the rail modes, and zone to station and station to zone for the bus modes. Figure 6-2 shows a schematic of a rail skim core partitioned into these three parts, or trip legs. Paths and skims are built for each of these legs separately:

i. For the rail station-to-zone and zone-to-rail station legs, which represent the rail access and egress, the path is built by including only the transit supporting modes for each primary rail mode and the walk modes.

ii. For the rail station-to-station leg, which represents the primary mode line-haul component of the trip, the path is built including only the primary rail mode, and excluding all supporting and walk modes.

Figure 6-2: Rail Skim Core Schematic

		Destinations	
		Zones	Stations
Origins	Zones (1 thru 11500)	(Unused)	Access leg All transit modes allowed except the primary rail mode
	Stations (11501 thru 12000)	Egress leg All transit modes allowed except the primary rail mode	Station-to-Station leg Only the primary rail mode is allowed

The mode choice model builds the entire zone-to-zone trip on the fly, by combining the different access, line haul and egress legs into candidate entire journeys such that the total weighted travel time is minimized for each origin and destination station pair.

The bus paths are built in a similar fashion, with the exception that the 'station-to-station' leg is not relevant, since the nature of these modes is such that there is no destination station.

BRT is a special case. Analysis of the on-board survey data revealed that many riders drive to a BRT station, ride the BRT system and transfer to an local rail line before reaching their final destination. As such, the sequence of elements is zone to station, station to station (BRT), station to station (local rail) and station to zone. Therefore, the virtual path consists of up to four legs, instead of just the three used for rail modes.

No drive access skims are required for the mode choice model. Drive access to all modes except local and rapid bus is handled by the mode choice virtual path builder. As indicated above, the locations where drive-to-transit trips access the bus or rail system are explicitly identified so that park-n-ride to zone skims are available to the mode choice model. The drive leg (zone to PNR/KNR location) is obtained from the drive-alone skims. For local and rapid bus, park-n-ride behavior is dominated by informal parking; that is, trips that access the bus system at locations other than formal park-n-ride lots. These trips are modeled using the walk access skims, with the walk access time replaced by an appropriate drive access time, given the distance.

Choice Availability

The availability of any given elemental choice is defined by the following rules:

- Drive alone: Available to all trips. For the toll option, a toll link must be in the path. For the HOV lane option, an HOV lane link must be in the path.
- Shared ride: Available to all trips. For the toll options, a toll link must be in the path.
- Walk: Available to trips up to 3 miles long.
- Bicycle: Available to trips up to 12 miles long.
- Transit: Available to all inter-zonal trips with non-zero primary mode in-vehicle time. In addition, commuter rail is available only to work trips.

Utility Specification

The general form of the utility function for the auto modes is:

$$Utility_m^{mkt} = civt \times (in\ vehicle\ travel\ time) + covt \times (terminal\ time)\ + ccost^{mkt}$$
$$\times \frac{(parking\ cost)}{2\ \times occfac} ccost^{mkt} + \frac{(veh.operating\ cost\ \times distance)}{occfac} ccost^{mkt}$$
$$+ \frac{(toll\ cost)}{occfac}\ ccost^{mkt} + (HOT\ lane\ toll) \times \frac{distance}{occfac} + toll\ penalty_m\ + K_m$$

Where:

occfac is the factor to discount travel costs among occupants of a carpool; typically this factor is smaller than the average vehicle occupancy. For the drive alone modes *occfac* is 1.0.

$toll\ penalty = \ min\{0.0,\ ctollintcpt + \ ctollslope * (toll\ distance)\}$, s a utility penalty applied to discourage very short trips from using the toll roads. The toll penalty decreases with distance and is zero for a trip that is 2.5 miles or longer.

K_m is the alternative-specific constant. The alternative-specific constant itself consists of several components. A common constant, for example, is applied to all the shared-ride modes, while a different

constant value is applied to the shared ride 3+ modes. The constants are applied so that the model is not over-specified, and each constant value can be readily interpreted in terms of the un-included attributes it represents. The mode choice coefficients are shown in Table 6-4.

Table 6-4: Mode Choice Utility Coefficients

Coefficient	HBW	HBO	NHB
In-Vehicle Travel Time	-0.02500	-0.01321	-0.01620
Terminal Time	-0.05300	-0.02853	-0.03500
Transit Walk Time (< 20 min)	-0.05300	-0.02853	-0.03500
Transit Walk Time (> 20 min)	-0.06200	-0.03276	-0.03500
Walk Mode Time (< 20 min)	-0.05300	-0.02853	-0.03500
Walk Mode Time (> 20 min)	-0.07950	-0.04280	-0.03500
Drive Time	-0.02500	-0.01321	-0.01620
First Wait Time (<5 min)	-0.06875	-0.03638	-0.04460
First Wait Time (>5 min)	-0.06875	-0.03638	-0.04460
Second Wait Time	-0.06875	-0.03638	-0.04460
Cost – zero cars	-0.00276	-0.00517	-0.00551
Cost – insufficient cars	-0.00130	-0.00284	
Cost – low income, sufficient cars	-0.00426	-0.00681	
Cost – medium income, sufficient cars	-0.00142	-0.00227	
Cost – high income, sufficient cars	-0.00086	-0.00134	
Primary Mode Logsum	0.75	0.75	0.75
Sub Mode Logsum	0.60	0.60	0.60
Access Mode Logsum	0.60	0.60	0.60

The general form of the utility function for the walk access bus transit modes is:

$$Utility^{mkt} = civt \times (in\ vehicle\ travel\ time) + cfw_1 \times first\ wait\ 1 + cfw_2 \times first\ wait\ 2 + cxw \times transfer\ wait + cwalk_1 \times walk\ time\ 1 + cwalk_2 \times walk\ time\ 2 + ccost^{mkt} \times fare + K$$

The computation of first wait time assumes that travelers know the schedule and consequently do not arrive at random. Wait time is computed as follows:

$$Wait\ Time = \sum_{n=1}^{N} \frac{min[hdwy - 15(n-1), 15]}{n+1}$$

where

$$N = \begin{cases} hdwy/15, & mod(hdwy/15) = 0 \\ hdwy/15 + 1, & mod(hdwy/15) > 0 \end{cases}$$

Since the wait time calculation accounts for non-random arrivals, the same coefficient is used for all wait time components, instead of applying different coefficients to differentiate between real time wait and wait time inconvenience. The walk time component is split into the first mile (less than 20 minutes) and subsequent walk time. The transit alternative specific constant consists of the sum of several terms, some of which are mode-specific and some that are market-specific. A more detailed description of the transit constants is provided below.

The general form of the utility function for the drive access bus transit modes is similar to the walk access utility, with drive access time replacing walk access time, and the inclusion of vehicle operating cost, parking cost, and a term that discourages drive access paths when the distance from origin to PNR

lot is longer than the distance from origin to final destination. The best drive access station is found by the virtual path builder by searching for the best combination of access time and station-to-destination utility among the stations that are within 15 miles of the production zone.

Similar terms as those used in the walk access bus transit utilities are used in the rail utility functions. Note however that the rail utility function consists of three components—zone to station, station to station, and station to zone—and therefore the terms that apply to each leg of the trip will vary, as appropriate. The station choice coefficients are shown in Table 6-5. These coefficients are based on model estimation work performed for Chicago. These coefficient values are expressed at the station choice level. In other words, they are not scaled by the appropriate LogSum coefficients for interpretation at the multinomial level. However, after scaling they closely match the multinomial values for in-vehicle time.

Table 6-5: Station Choice Utility Coefficients

Attribute	Coefficient					
	HBW		HBO		NHB	
	Value	Ratio wrt IVT	Value	Ratio wrt IVT	Value	Ratio wrt IVT
In-Vehicle Time	-0.16650	--	-0.09756	--	-0.11964	--
Drive Access Time	-0.41292	2.5	-0.24195	2.5	-0.25842	2.2
First Wait Time	-0.35298	2.1	-0.21073	2.2	-0.25842	2.2
Transfer Wait Time	-0.35798	2.2	-0.24195	2.5	-0.29073	2.4
Number of Transfers	-1.44400	8.7	-0.84584	8.7	-1.03761	8.7
Walk Time	-0.25974	1.6	-0.21073	2.2	-0.25842	2.2
Parking Capacity	0.00023	--	0.00023	--	0.00023	--
Drive Egress Time	-0.41292	--	-0.24195	--	-0.25842	--
In-Vehicle Time (CRail only)	-0.12488	--	-0.07317	--	-0.08973	--

Note: IVT – In-Vehicle Time

Market Segmentation

The mode choice models were initially segmented by trip purpose, time period and four household income levels. This is the minimal level of segmentation required to expose trips to the correct transportation level of service and ensure that the model coefficients capture differences in travel behavior due to the type of trip and household wealth, in particular value of time. The final models are stratified by a combination of household income and car sufficiency, in order to better reflect the effect of transit-dependent users on mode and destination choice.

An important element of the market segmentation is the stratification of the alternative-specific constants (ASC). The specification of the ASCs responds to an understanding of the expected contribution of un-included attributes to the utility of each choice. Un-included attributes can be thought of as being a function of trip-maker characteristics, trip characteristics, or mode characteristics. The ASC can be considered as composed of two parts, one part that varies across demographic characteristics (for example, across household income groups or car ownership groups), and a second part that varies across mode and/or trip characteristics.

The transit constant is stratified by household income level, car sufficiency and trip distance, but not by primary transit mode. The stratification by household income and car sufficiency is recommended

by FTA and responds to the higher likelihood of transit patronage among transit-dependent riders, all else equal. The stratification by trip distance is unique to the Southern California region and is based on analysis of the on-board survey data performed for LACMTA, as part of their model calibration and validation effort[2]. Specifically, three distinct transit markets were observed: a short distance market, primarily served by local and rapid bus and to a lesser extent local rail, a medium distance market served by local rail, express and transitway buses, and a long distance market served by commuter rail and a few express buses. The transit constant is therefore stratified into 5-mile distance ranges, and capped at 55 miles.

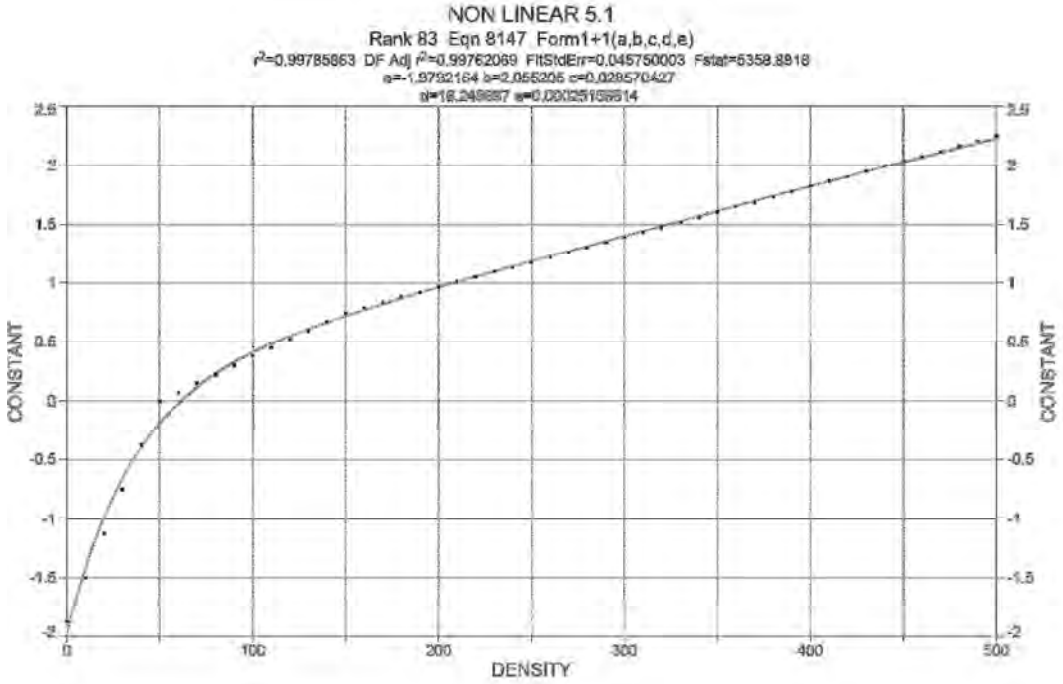
The primary transit mode constants are stratified by mode, but not by household income or car sufficiency. The rationale is that some un-included mode attributes are equally perceived by all riders, regardless of their income level. For example, the limited service span of express bus service is equally undesirable to all riders. The primary transit mode constants play a central role in an analysis of transit alternatives, because they contribute directly to the user benefits of each alternative mode as compared to the baseline alternative.

The transit constants also account for the effect of land use form. As part of the mode choice model calibration work performed for LACMTA, it was found that the level of service attributes and constants described above were insufficient to explain transit ridership in the more dense areas of the region. Functions of population and employment density were developed as part of this calibration work to further segment the transit constant. A sample urban form function is shown in Figure 6-3.

A CBD attraction constant that varies by mode was necessary to match observed HBW CBD transit attractions. A drive to transit constant, applied at the access mode level of the nest, captures the differences in the perception of drive and walk access across income and car sufficiency levels. Two additional constants werre needed to adequately match the proportion of commuter rail riders that park access commuter rail or local rail by bus.

[2] Los Angeles Mode Choice Model: Draft Calibration/Validation Report. Prepared for the Los Angeles Metropolitan Transit Authority, by Parsons Brinckerhoff. Los Angeles, CA: September 2010.

Figure 6-3: Density Component of the Transit Constant, HBWD Peak, Production End



Calibration Target Values

The mode choice calibration process consisted of adjusting the model constants to match observed transit travel patterns. These travel pattern summaries are called calibration target values; they are derived from the household travel survey and the on-board transit surveys, supplemented with ridership data. Calibration target values consist of various trip summaries, including:

- Number of trips by time period, trip purpose, mode and market segment (combined household survey and on-board surveys, expanded to validation year);
- On-board transit trip flows (for aggregate and district-level validation), by purpose, transit submode and time period;
- Trip length distribution (distance) by transit submode and market segment;
- Number of trips by access/egress mode (walk, bus, PNR, KNR) by transit submode;
- Station-to-station trips, station boardings (total, by transit submode and by access mode); and
- Transfer rates or transfer trips, by transit submode and by access mode.

Each data source made a specific contribution to the development of the calibration target values: the 2012 California Household Travel Survey provided the share of auto and non-motorized trips across purposes, time periods and household income markets, while the transit on-board surveys provided the number of transit trips by mode, access submode, and household income. The total number of trips was obtained from the trip generation model forecasts, and the targets as derived from the survey data were scaled so that the number of transit trips remains constant. School bus trips were removed from the

HBSC targets, since this mode is not part of the choice set. Tables 6-7 to 6-10 show the final calibration targets.

Table 6-6: HBW and HBO Mode Choice Calibration Targets, Peak Period

Household Segment	Mode	Trip Purpose					
		HBWD	HBWS	HBSh	HBSR	HBSP	HBO
No cars	Walk	10,248	6,554	53,106	23,946	115,695	37,359
	Bike	5,463	1,306	7,019	3,325	1,298	4,436
	Drive alone	3,400	4,598	2,530	2,406	5,963	3,767
	Shared ride 2	14,611	9,399	10,267	13,130	14,088	7,866
	Shared ride 3	6,088	8,203	4,838	4,346	23,173	2,314
	Shared ride 4+	3,653	5,656	3,327	2,240	19,470	3,663
	Walk to transit	72,898	-	17,968	11,552	-	36,978
	Kiss and ride	8,502	-	1,058	1,251	-	3,623
	Park and ride	1,212	-	-	-	-	-
	Total	**126,075**	**35,716**	**100,114**	**62,196**	**179,687**	**100,006**
Car competition	Walk	51,651	7,982	69,223	43,130	338,680	148,308
	Bike	5,971	1,322	4,445	7,798	1,931	11,989
	Drive alone	246,550	104,158	173,058	50,809	194,318	141,214
	Shared ride 2	123,682	31,475	72,370	112,438	271,491	223,758
	Shared ride 3	43,764	28,384	64,305	59,051	194,122	108,907
	Shared ride 4+	22,834	15,417	61,708	48,062	226,304	92,394
	Walk to transit	151,452	-	11,171	7,848	-	64,782
	Kiss and ride	5,629	-	413	561	-	1,836
	Park and ride	8,276	-	269	561	-	3,361
	Total	**659,808**	**188,737**	**456,962**	**330,258**	**1,226,845**	**796,549**
Income 0-35K	Walk	23,934	3,925	29,620	22,408	37,656	55,464
	Bike	2,853	699	1,444	925	368	5,921
	Drive alone	406,942	126,590	140,348	88,374	134,084	126,792
	Shared ride 2	47,379	17,680	38,986	44,480	184,121	98,115
	Shared ride 3	16,765	16,687	51,981	20,232	131,333	50,844
	Shared ride 4+	8,747	11,059	28,589	19,450	125,117	57,115
	Walk to transit	134,001	-	1,413	2,836	-	25,508
	Kiss and ride	4,443	-	82	199	-	797
	Park and ride	11,213	-	214	199	-	2,726
	Total	**656,276**	**176,639**	**292,678**	**199,104**	**612,678**	**423,282**
Income 35-75K	Walk	38,570	3,659	25,347	35,203	43,717	74,180
	Bike	4,168	422	685	1,622	404	8,064
	Drive alone	1,138,842	304,940	245,017	118,230	231,153	253,897
	Shared ride 2	89,331	30,808	38,020	104,546	288,130	179,958
	Shared ride 3	31,609	30,204	50,693	49,491	200,155	101,527
	Shared ride 4+	16,492	13,515	63,367	32,433	200,747	110,849
	Walk to transit	35,401	-	1,302	1,041	-	4,096
	Kiss and ride	2,540	-	38	41	-	70
	Park and ride	6,086	-	115	96	-	367
	Total	**1,363,039**	**383,548**	**424,584**	**342,703**	**964,306**	**733,008**
Income over 75K	Walk	42,276	8,791	18,185	42,109	44,887	122,464
	Bike	4,244	673	461	2,164	440	8,110
	Drive alone	2,918,200	892,298	527,834	211,532	473,235	632,911
	Shared ride 2	122,872	31,701	67,027	250,618	530,783	503,935
	Shared ride 3	24,574	52,073	100,540	117,688	386,091	303,909
	Shared ride 4+	6,144	23,249	125,675	82,258	345,542	222,206
	Walk to transit	18,222	-	516	304	-	1,673
	Kiss and ride	2,764	-	3	27	-	52
	Park and ride	28,734	-	23	70	-	617
	Total	**3,168,030**	**1,008,784**	**840,263**	**706,769**	**1,780,978**	**1,795,877**

Table 6-7: HBW and HBO Mode Choice Calibration Targets, Off-Peak Period

Household Segment	Mode	Trip Purpose					
		HBWD	HBWS	HBSh	HBSR	HBSP	HBO
No cars	Walk	5,893	4,373	82,377	47,747	62,333	36,756
	Bike	2,326	784	10,864	6,630	699	4,555
	Drive alone	1,448	2,761	3,733	4,797	3,213	3,157
	Shared ride 2	4,419	5,085	15,890	26,181	12,650	11,302
	Shared ride 3	2,946	4,557	7,489	8,665	10,404	4,987
	Shared ride 4+	1,473	3,882	5,150	4,467	7,518	5,262
	Walk to transit	34,773	-	20,889	11,298	-	52,740
	Kiss and ride	4,056	-	1,230	1,223	-	5,996
	Park and ride	578	-	-	-	-	-
	Total	**57,912**	**21,443**	**147,622**	**111,009**	**96,816**	**124,756**
Car competition	Walk	31,011	4,839	102,552	77,805	180,605	169,564
	Bike	3,585	801	6,585	14,067	3,025	15,231
	Drive alone	148,028	63,149	256,381	91,656	104,760	202,701
	Shared ride 2	74,258	19,083	107,214	202,833	182,958	295,383
	Shared ride 3	26,276	17,209	95,267	106,525	118,783	138,351
	Shared ride 4+	13,709	9,347	91,420	86,702	71,373	117,373
	Walk to transit	72,801	-	13,481	8,768	-	48,434
	Kiss and ride	3,309	-	499	627	-	1,469
	Park and ride	6,618	-	325	627	-	4,386
	Total	**379,596**	**114,428**	**673,724**	**589,611**	**661,504**	**992,891**
Income 0-35K	Walk	10,897	3,569	43,716	40,324	20,171	64,636
	Bike	1,233	424	2,132	1,664	330	6,908
	Drive alone	181,987	75,573	207,137	159,028	90,370	204,280
	Shared ride 2	21,169	10,718	57,538	80,042	103,246	126,767
	Shared ride 3	7,449	10,116	76,717	36,408	66,918	59,779
	Shared ride 4+	3,818	6,705	42,194	35,000	49,510	55,346
	Walk to transit	51,971	-	1,130	2,652	-	7,523
	Kiss and ride	1,018	-	85	213	-	786
	Park and ride	4,722	-	767	213	-	1,798
	Total	**284,263**	**107,105**	**431,416**	**355,545**	**330,546**	**527,823**
Income 35-75K	Walk	18,432	6,042	35,513	62,956	23,462	82,500
	Bike	2,004	326	2,888	2,901	322	10,065
	Drive alone	545,223	181,028	405,065	211,441	157,549	354,160
	Shared ride 2	42,716	18,683	62,318	186,968	161,535	226,521
	Shared ride 3	15,115	18,317	62,318	88,509	99,435	116,250
	Shared ride 4+	7,886	8,196	56,086	58,002	77,395	119,901
	Walk to transit	14,912	-	1,499	1,170	-	2,759
	Kiss and ride	175	-	38	92	-	334
	Park and ride	1,571	-	113	208	-	1,005
	Total	**648,032**	**232,592**	**625,838**	**612,247**	**519,698**	**913,495**
Income over 75K	Walk	22,178	15,633	24,691	76,485	19,568	125,300
	Bike	2,258	776	2,785	2,603	381	23,541
	Drive alone	1,532,862	530,548	802,467	377,876	318,934	880,998
	Shared ride 2	64,542	19,233	98,765	447,699	286,174	596,754
	Shared ride 3	12,908	31,594	148,148	210,234	187,347	356,097
	Shared ride 4+	3,227	14,106	160,493	146,943	146,911	253,440
	Walk to transit	9,329	-	1,059	529	-	1,414
	Kiss and ride	499	-	25	45	-	128
	Park and ride	6,181	-	74	123	-	437
	Total	**1,653,985**	**611,889**	**1,238,508**	**1,262,538**	**959,316**	**2,238,109**

Table 6-8: HBSC, HBCU and NHB Mode Choice Calibration Targets, Peak Period

Household Segment	Mode	Trip Purpose			
		HBSC	HBCU	WBO	OBO
All	Walk	889,863	43,174	71,513	471,901
	Bike	157,035	7,841	72,705	32,648
	Drive alone	111,328	201,529	1,561,008	2,315,953
	Shared ride 2	746,206	25,960	55,302	975,198
	Shared ride 3	649,432	8,971	117,782	1,062,786
	Shared ride 4+	618,179	12,606	74,352	1,361,955
	Walk to transit	20,980	68,943	43,358	27,533
	Kiss and ride	1,003	1,626	4,306	353
	Park and ride	974	4,804	2,375	1226
	School Bus	390,094	0	0	0
	Total	**3,585,093**	**375,455**	**2,002,701**	**6,249,554**

Table 6-9: HBSC, HBCU and NHB Mode Choice Calibration Targets, Off-Peak Period

Household Segment	Mode	Trip Purpose			
		HBSC	HBCU	WBO	OBO
All	Walk	403,825	36,458	135,680	545,463
	Bike	71,263	5,570	22,449	47,432
	Drive alone	59,171	171,872	1,317,194	3,870,404
	Shared ride 2	209,036	15,410	93,486	1,088,701
	Shared ride 3	176,191	10,917	72,151	1,188,226
	Shared ride 4+	161,886	7,278	62,443	1,216,102
	Walk to transit	10,138	58,181	31,518	27,419
	Kiss and ride	191	1,844	1,626	1,506
	Park and ride	756	1,434	2,194	1,628
	School Bus	175,653	0	0	0
	Total	**1,268,109**	**308,965**	**1,738,741**	**7,986,881**

Model Calibration and Validation

The calibration and validation of the mode choice model comprised an extensive, iterative effort that involved practically all model components, and in particular trip distribution, mode choice and transit path building. Mode-specific constants were first calibrated to match the household-based targets. The resulting relative values of these constants are examined for reasonableness, in particular the line-haul constants. Subsequently, the household stratified constants were recalibrated to the car sufficiency and income targets. The objective of the calibration is to determine the value of the alternative-specific constants. In addition, a set of coefficients were added to the transit utilities to reduce the number of premium mode trips that transfer to local bus at the destination end of the trip. The expected transfer frequency was established from the on-board survey data.

Table 6-10 shows the calibrated values of the transit line-haul constants, expressed as a constant and in equivalent minutes of in-vehicle time, relative to the local bus constant (the local bus constant is 0.0). Table 6-11 to Table 6-15 shows the estimated mode split and shares, compared to the target mode shares.

Table 6-10: Transit Line-Haul Constants (eq. in-vehicle time minutes)

Trip Purpose	Primary Transit Mode						
	Rapid Bus	Express Bus	Transitway Bus	BRT	Urban Rail	Commuter Rail	High Speed Rail *
HBWD PK	0.2980 (11.9)	-0.0899 (-3.6)	0.1623 (6.5)	0.1207 (4.8)	0.4125 (16.5)	1.2000 (48.0)	1.4400 (57.0)
HBWD OP	0.2000 (8.0)	-0.2601 (-10.4)	-0.2800 (-11.2)	0.1700 (6.8)	0.5500 (22.0)	0.6750 (27.0)	0.8100 (32.4)
HBCU	0.1213 (9.2)	-0.1500 (-11.3)	0.0750 (5.7)	0.0750 (5.7)	0.3115 (23.6)	0.3000 (22.7)	0.3600 (27.2)
HBSC	0.0641 (4.8)	-0.0793 (-6.0)	0.0396 3.0	0.0396 (3.0)	0 (0.0)	0 (0.0)	0 (0.0)
HBSH	0.0641 (4.8)	-0.0793 (-6.0)	0.0396 (3.0)	0.0396 (3.0)	0.1608 (12.2)	0.1585 (12.0)	0.1900 (14.4)
HBSR	0.0641 (4.8)	-0.0793 (-6.0)	0.0396 (3.0)	0.0396 (3.0)	0.1608 (12.2)	0.1585 (12.0)	0.1900 (14.4)
HBO	0.0660 (5.0)	-0.0764 (-5.8)	0.1020 (7.7)	0.0700 (5.3)	0.1584 (12.0)	0.1056 (8.0)	0.1280 (12.1)
WBO	0.0810 (5.0)	-0.2430 (-15.0)	-0.1620 -10.0	0.1620 (10.0)	0.1944 (12.0)	0.4050 (25.0)	0.4860 (29.4)
OBO	0.0810 (5.0)	-0.2430 (-15.0)	0.0810 (5.0)	0.0162 (10.0)	0.1944 (12.0)	0.1292 (7.8)	0.1550 (9.6)

(*) The high speed rail constants were asserted at 20% premium over commuter rail.

Table 6-11: HBW Peak Period Mode Choice Calibration Results

Estimated Trips							
Household Segment	**Drive Alone**	**Shared Ride 2**	**Shared Ride 3**	**Shared Ride 4+**	**Transit**	**Non-Motorized**	**Total**
No Cars	2,507	27,470	14,522	10,035	71,782	26,476	152,790
Car Competition	265,588	128,872	52,803	30,189	80,169	81,814	639,435
Income 0-35K	385,284	62,613	42,574	40,590	131,361	42,934	705,357
Income 35-75K	1,270,964	108,591	52,726	36,136	29,384	67,343	1,565,144
Income over 75K	2,639,318	111,375	26,615	7,454	17,872	64,592	2,867,227
Total	4,563,661	438,921	189,239	124,404	330,568	283,159	5,929,954
Estimated Mode Shares							
Household Segment	**Drive Alone**	**Shared Ride 2**	**Shared Ride 3**	**Shared Ride 4+**	**Transit**	**Non-Motorized**	**Total**
No Cars	1.6%	18.0%	9.5%	6.6%	47.0%	17.3%	100%
Car Competition	41.5%	20.2%	8.3%	4.7%	12.5%	12.8%	100%
Income 0-35K	54.6%	8.9%	6.0%	5.8%	18.6%	6.1%	100%
Income 35-75K	81.2%	6.9%	3.4%	2.3%	1.9%	4.3%	100%
Income over 75K	92.1%	3.9%	0.9%	0.3%	0.6%	2.3%	100%
Total	77.0%	7.4%	3.2%	2.1%	5.6%	4.8%	**100%**
Target Mode Shares							
Household Segment	**Drive Alone**	**Shared Ride 2**	**Shared Ride 3**	**Shared Ride 4+**	**Transit**	**Non-Motorized**	**Total**
No Cars	4.9%	14.8%	8.7%	5.7%	51.4%	14.5%	100%
Car Competition	41.3%	18.3%	8.5%	4.5%	19.5%	7.9%	100%
Income 0-35K	64.1%	7.8%	4.0%	2.4%	18.0%	3.8%	100%
Income 35-75K	82.9%	6.9%	3.5%	1.7%	2.3%	2.7%	100%
Income over 75K	91.2%	3.7%	1.8%	0.7%	1.2%	1.3%	100%
Total	**79.2%**	**6.7%**	**3.3%**	**1.6%**	**6.3%**	**2.9%**	**100%**

Table 6-12: HBW Off-Peak Period Mode Choice Calibration Results

Estimated Trips							
Household Segment	**Drive Alone**	**Shared Ride 2**	**Shared Ride 3**	**Shared Ride 4+**	**Transit**	**Non-Motorized**	**Total**
No Cars	2,008	12,429	10,828	6,371	65,326	18,852	115,813
Car Competition	181,941	86,684	35,927	21,149	54,407	48,098	428,207
Income 0-35K	229,445	32,615	19,467	17,479	82,757	27,044	408,808
Income 35-75K	733,940	59,061	27,165	18,513	27,268	38,189	904,136
Income over 75K	1,528,170	61,391	14,156	4,044	23,631	32,679	1,664,072
Total	2,675,505	252,179	107,543	67,557	253,390	164,861	3,521,036
Estimated Mode Shares							
Household Segment	**Drive Alone**	**Shared Ride 2**	**Shared Ride 3**	**Shared Ride 4+**	**Transit**	**Non-Motorized**	**Total**
No Cars	1.7%	10.7%	9.3%	5.5%	56.4%	16.3%	100%
Car Competition	42.5%	20.2%	8.4%	4.9%	12.7%	11.2%	100%
Income 0-35K	56.1%	8.0%	4.8%	4.3%	20.2%	6.6%	100%
Income 35-75K	81.2%	6.5%	3.0%	2.0%	3.0%	4.2%	100%
Income over 75K	91.8%	3.7%	0.9%	0.2%	1.4%	2.0%	100%
Total	76.0%	7.2%	3.1%	1.9%	7.2%	4.7%	**100%**
Target Mode Shares							
Household Segment	**Drive Alone**	**Shared Ride 2**	**Shared Ride 3**	**Shared Ride 4+**	**Transit**	**Non-Motorized**	**Total**
No Cars	5.0%	11.6%	9.0%	6.3%	51.5%	16.6%	100%
Car Competition	43.1%	18.8%	9.0%	4.8%	16.3%	8.1%	100%
Income 0-35K	66.2%	8.1%	4.3%	2.6%	14.6%	4.1%	100%
Income 35-75K	82.7%	7.0%	3.7%	1.8%	1.8%	3.0%	100%
Income over 75K	91.1%	3.7%	2.0%	0.8%	0.7%	1.8%	100%
Total	**79.5%**	**6.7%**	**3.5%**	**1.7%**	**5.2%**	**3.3%**	**100%**

Table 6-13: HBNW Peak Period Mode Choice Calibration Results

Estimated Trips							
Household Segment	**Drive Alone**	**Shared Ride 2**	**Shared Ride 3**	**Shared Ride 4+**	**Transit**	**Non-Motorized**	**Total**
No Cars	21,301	74,807	48,530	59,167	106,828	330,432	641,066
Car Competition	640,727	733,064	526,867	579,656	56,973	812,658	3,349,945
Income 0-35K	423,063	275,691	243,022	322,624	23,300	209,476	1,497,176
Income 35-75K	1,095,195	732,254	521,233	567,992	6,054	275,169	3,197,898
Income over 75K	1,973,826	1,406,825	966,743	897,567	2,517	312,965	5,560,443
Total	4,154,112	3,222,640	2,306,395	2,427,006	195,672	1,940,701	14,246,528
Estimated Mode Shares							
Household Segment	**Drive Alone**	**Shared Ride 2**	**Shared Ride 3**	**Shared Ride 4+**	**Transit**	**Non-Motorized**	**Total**
No Cars	3.3%	11.7%	7.6%	9.2%	16.7%	51.5%	100%
Car Competition	19.1%	21.9%	15.7%	17.3%	1.7%	24.3%	100%
Income 0-35K	28.3%	18.4%	16.2%	21.5%	1.6%	14.0%	100%
Income 35-75K	34.2%	22.9%	16.3%	17.8%	0.2%	8.6%	100%
Income over 75K	35.5%	25.3%	17.4%	16.1%	0.0%	5.6%	100%
Total	29.2%	22.6%	16.2%	17.0%	1.4%	13.6%	**100%**
Target Mode Shares							
Household Segment	**Drive Alone**	**Shared Ride 2**	**Shared Ride 3**	**Shared Ride 4+**	**Transit**	**Non-Motorized**	**Total**
No Cars	3.3%	10.3%	7.8%	65%	16.4%	55.7%	100%
Car Competition	19.9%	24.2%	15.2%	15.2%	3.2%	22.3%	100%
Income 0-35K	32.0%	23.9%	16.7%	15.1%	2.2%	10.1%	100%
Income 35-75K	34.4%	24.8%	16.3%	16.5%	0.3%	7.7%	100%
Income over 75K	36.0%	26.4%	17.7%	15.1%	0.1%	4.7%	100%
Total	**30.4%**	**24.7%**	**16.4%**	**15.1%**	**1.7%**	**11.8%**	**100%**

Table 6-14: HBNW Off-Peak Period Mode Choice Calibration Results

Estimated Trips							
Household Segment	**Drive Alone**	**Shared Ride 2**	**Shared Ride 3**	**Shared Ride 4+**	**Transit**	**Non-Motorized**	**Total**
No Cars	30,373	123,113	84,841	91,978	93,261	440,062	863,627
Car Competition	875,994	887,666	632,204	605,685	35,298	908,184	3,945,031
Income 0-35K	613,289	319,118	292,887	389,246	11,274	257,109	1,882,923
Income 35-75K	1,585,308	823,577	557,267	548,750	4,642	326,328	3,845,873
Income over 75K	2,787,340	1,573,289	1,079,494	920,406	2,038	394,829	6,757,397
Total	5,892,303	3,726,764	2,646,692	2,556,065	146,515	2,326,511	17,294,851
Estimated Mode Shares							
Household Segment	**Drive Alone**	**Shared Ride 2**	**Shared Ride 3**	**Shared Ride 4+**	**Transit**	**Non-Motorized**	**Total**
No Cars	3.5%	14.3%	9.8%	10.7%	10.8%	51.0%	100%
Car Competition	22.2%	22.5%	16.0%	15.4%	0.9%	23.0%	100%
Income 0-35K	32.6%	16.9%	15.6%	20.7%	0.6%	13.7%	100%
Income 35-75K	41.2%	21.4%	14.5%	14.3%	0.1%	8.5%	100%
Income over 75K	41.2%	23.3%	16.0%	13.6%	0.0%	5.8%	100%
Total	34.1%	21.5%	15.3%	14.8%	0.8%	13.5%	**100%**
Target Mode Shares							
Household Segment	**Drive Alone**	**Shared Ride 2**	**Shared Ride 3**	**Shared Ride 4+**	**Transit**	**Non-Motorized**	**Total**
No Cars	3.1%	13.7%	6.6%	4.7%	19.4%	52.5%	100%
Car Competition	22.5%	27.0%	15.7%	12.6%	2.7%	19.5%	100%
Income 0-35K	40.2%	22.3%	14.6%	11.1%	0.9%	10.9%	100%
Income 35-75K	42.2%	23.9%	13.7%	11.7%	0.3%	8.3%	100%
Income over 75K	41.8%	25.1%	15.8%	12.4%	0.1%	4.8%	100%
Total	**36.1%**	**24.5%**	**14.9%**	**11.9%**	**1.5%**	**11.2%**	**100%**

Table 6-15: HBSC and NHB Mode Choice Calibration Results

Estimated Trips								
Trip Purpose	**Drive Alone**	**Shared Ride 2**	**Shared Ride 3**	**Shared Ride 4+**	**Transit**	**Non-Motorized**	**School Bus**	**Total**
HBSC Peak	181,290	694,324	623,753	636,087	129,355	980,341	372,461	**3,617,613**
HBSC Off-Peak	302,893	190,354	175,296	179,771	92,219	525,140	164,211	**1,629,887**
NHB Peak	3,192,592	729,787	1,102,478	1,694,324	193,667	780,766	-	**7,693,615**
NHB Off-Peak	6,182,540	1,017,207	1,538,377	1,991,194	120,285	899,845	-	**11,749,49**
Estimated Mode Shares								
Trip Purpose	**Drive Alone**	**Shared Ride 2**	**Shared Ride 3**	**Shared Ride 4+**	**Transit**	**Non-Motorized**	**School Bus**	**Total**
HBSC Peak	5.0%	19.2%	17.2%	17.6%	3.6%	27.1%	10.3%	100.0%
HBSC Off-Peak	18.6%	11.7%	10.8%	11.0%	5.7%	32.2%	10.1%	100.0%
NHB Peak	41.5%	9.5%	14.3%	22.0%	2.5%	10.1%	-	100.0%
NHB Off-Peak	52.6%	8.7%	13.1%	16.9%	1.0%	7.7%	-	100.0%
Target Mode Shares								
Trip Purpose	**Drive Alone**	**Shared Ride 2**	**Shared Ride 3**	**Shared Ride 4+**	**Transit**	**Non-Motorized**	**School Bus**	**Total**
HBSC Peak	7.9%	19.4%	16.6%	15.9%	2.5%	27.7%	10.1%	**100%**
HBSC Off-Peak	14.7%	14.2%	11.9%	10.7%	4.6%	32.8%	11.1%	**100%**
NHB Peak	47.0%	12.5%	14.3%	17.4%	1.0%	7.9%	0.0%	**100%**
NHB Off-Peak	53.2%	12.2%	13.0%	13.2%	0.7%	7.7%	0.0%	**100%**

Mode Choice Model Results

Table 6-16: Year 2012 Mode Choice Summary Statistics (Home-Based Work)

Mode Choice	Imperial		Los Angeles		Orange		Riverside		San Bernardino		Ventura		Total	
Vehicle Trips	68,151	84.47%	4,902,340	79.20%	1,693,519	84.77%	1,045,887	86.53%	987,223	85.97%	472,538	88.40%	9,169,658	82.16%
Drive Alone	64,865	80.40%	4,568,558	73.80%	1,579,836	79.08%	975,845	80.74%	918,443	79.98%	451,619	84.48%	8,559,165	76.69%
2 Person Carpool	2,294	2.84%	218,131	3.52%	77,313	3.87%	41,049	3.40%	40,435	3.52%	14,240	2.66%	393,463	3.53%
3+ Person Carpool	992	1.23%	115,652	1.87%	36,370	1.82%	28,993	2.40%	28,345	2.47%	6,679	1.25%	217,031	1.94%
Auto Passenger Trips	4,782	5.93%	508,317	8.21%	168,570	8.44%	113,802	9.42%	111,563	9.71%	30,998	5.80%	938,032	8.41%
Vehicle Occupancy	1.07		1.10		1.10		1.11		1.11		1.07		1.10	
Transit Trips	540	0.67%	465,343	7.52%	43,454	2.18%	8,773	0.73%	10,983	0.96%	5,679	1.06%	534,772	4.79%
Non-Motorized Person Trips	7,203	8.93%	314,204	5.08%	92,218	4.62%	40,188	3.33%	38,595	3.36%	25,355	4.74%	517,763	4.64%
Total Person Trips	**80,677**	**100%**	**6,190,203**	**100%**	**1,997,761**	**100%**	**1,208,650**	**100%**	**1,148,365**	**100%**	**534,570**	**100%**	**11,160,22**	**100%**

Table 6-17: Year 2012 Mode Choice Summary Statistics (Home-Based Non-Work)

Mode Choice	Imperial		Los Angeles		Orange		Riverside		San Bernardino		Ventura		Total	
Vehicle Trips	130,972	52.10%	7,746,889	49.29%	2,610,083	53.10%	1,983,361	54.90%	1,823,991	54.73%	756,685	55.90%	15,051,982	51.58%
Drive Alone	88,077	35.04%	4,571,441	29.09%	1,591,875	32.39%	1,272,593	35.23%	1,163,692	34.92%	494,276	36.51%	9,181,953	31.46%
2 Person Carpool	25,426	10.11%	1,703,766	10.84%	567,548	11.55%	401,478	11.11%	372,429	11.17%	150,244	11.10%	3,220,892	11.04%
3+ Person Carpool	17,469	6.95%	1,471,682	9.36%	450,660	9.17%	309,290	8.56%	287,870	8.64%	112,166	8.29%	2,649,137	9.08%
Auto Passenger Trips	69,992	27.84%	5,458,945	34.73%	1,717,444	34.94%	1,190,645	32.96%	1,106,942	33.21%	436,443	32.24%	9,980,411	34.20%
Vehicle Occupancy	1.53		1.70		1.66		1.60		1.61		1.58		1.66	
Transit Trips	529	0.21%	241,454	1.54%	25,015	0.51%	6,539	0.18%	6,198	0.19%	2,601	0.19%	282,335	0.97%
Non-Motorized Person Trips	49,890	19.85%	2,269,110	14.44%	562,705	11.45%	432,213	11.96%	395,629	11.87%	158,016	11.67%	3,867,564	13.25%
Total Person Trips	**251,384**	**100%**	**15,716,39**	**100%**	**4,915,247**	**100%**	**3,612,757**	**100%**	**3,332,760**	**100%**	**1,353,746**	**100%**	**29,182,291**	**100%**

Does not include home-based school trips.

Table 6-18: Year 2012 Mode Choice Summary Statistics (Non-Home-Based)

Mode Choice	Imperial		Los Angeles		Orange		Riverside		San Bernardino		Ventura		Total	
Vehicle Trips	70,273	68.88%	5,776,510	57.44%	2,103,957	61.75%	1,169,828	67.29%	1,147,771	67.61%	525,659	66.95%	10,793,999	60.68%
Drive Alone	59,297	58.12%	4,353,670	43.29%	1,627,632	47.77%	949,955	54.64%	931,857	54.89%	432,058	55.03%	8,354,470	46.97%
2 Person Carpool	5,139	5.04%	433,294	4.31%	157,712	4.63%	85,435	4.91%	82,129	4.84%	36,675	4.67%	800,385	4.50%
3+ Person Carpool	5,837	5.72%	989,546	9.84%	318,613	9.35%	134,438	7.73%	133,785	7.88%	56,926	7.25%	1,639,144	9.22%
Auto Passenger Trips	20,566	20.16%	3,048,852	30.32%	999,853	29.34%	440,766	25.35%	435,736	25.67%	187,136	23.83%	5,132,908	28.86%
Vehicle Occupancy	1.29		1.53		1.48		1.38		1.38		1.36		1.48	
Transit Trips	65	0.06%	240,754	2.39%	20,273	0.60%	2,408	0.14%	2,457	0.14%	2,108	0.27%	268,065	1.51%
Non-Motorized Person Trips	11,113	10.89%	990,857	9.85%	283,263	8.31%	125,472	7.22%	111,771	6.58%	70,297	8.95%	1,592,774	8.95%
Total Person Trips	**102,017**	**100%**	**10,056,973**	**100%**	**3,407,347**	**100%**	**1,738,474**	**100%**	**1,697,734**	**100%**	**785,200**	**100%**	**17,787,746**	**100%**

Table 6-19: Year 2012 Mode Choice Summary Statistics (Home-Based School)

Mode Choice	Imperial		Los Angeles		Orange		Riverside		San Bernardino		Ventura		Total	
Vehicle Trips	14,757	24.95%	745,615	27.25%	235,500	27.89%	184,006	26.40%	192,525	28.44%	67,326	27.99%	1,439,729	27.40%
Drive Alone	4,076	6.89%	248,720	9.09%	87,492	10.36%	57,925	8.31%	66,630	9.84%	24,461	10.17%	489,305	9.31%
2 Person Carpool	5,103	8.63%	230,334	8.42%	70,493	8.35%	57,188	8.21%	58,050	8.57%	20,301	8.44%	441,468	8.40%
3+ Person Carpool	5,579	9.43%	266,561	9.74%	77,515	9.18%	68,893	9.89%	67,845	10.02%	22,563	9.38%	508,956	9.69%
Auto Passenger Trips	21,523	36.39%	1,020,697	37.30%	342,600	40.58%	306,503	43.98%	276,082	40.78%	95,483	39.70%	2,062,888	39.26%
Vehicle Occupancy	2.46		2.37		2.45		2.67		2.43		2.42		2.43	
Transit & School Bus Trips	869	1.47%	167,664	6.13%	23,182	2.75%	10,095	1.45%	8,409	1.24%	5,408	2.25%	215,627	4.10%
Non-Motorized Person Trips	21,994	37.19%	802,565	29.33%	242,960	28.78%	196,316	28.17%	200,017	29.54%	72,279	30.05%	1,536,131	29.24%
Total Person Trips	**59,143**	**100%**	**2,736,541**	**100%**	**844,243**	**100%**	**696,920**	**100%**	**677,033**	**100%**	**240,495**	**100%**	**5,254,375**	**100%**

Table 6-20: Year 2012 Mode Choice Summary Statistics (all trip purposes)

Peak Periods	Imperial		Los Angeles		Orange		Riverside		San Bernardino		Ventura		Total	
Vehicle Trips	140,215	55.09%	9,092,198	53.65%	3,144,056	57.84%	2,097,268	58.14%	1,981,038	58.24%	871,062	60.67%	17,325,838	55.74%
Drive Alone	103,409	40.63%	6,389,357	37.70%	2,267,933	41.72%	1,517,237	42.06%	1,425,396	41.91%	658,361	45.86%	12,361,693	39.77%
2 Person Carpool	20,329	7.99%	1,286,241	7.59%	434,263	7.99%	297,570	8.25%	283,626	8.34%	111,376	7.76%	2,433,404	7.83%
3+ Person Carpool	16,477	6.47%	1,416,600	8.36%	441,861	8.13%	282,462	7.83%	272,017	8.00%	101,325	7.06%	2,530,741	8.14%
Auto Passenger Trips	64,176	25.21%	4,986,818	29.42%	1,625,874	29.91%	1,072,385	29.73%	1,004,634	29.54%	385,815	26.87%	9,139,703	29.40%
Vehicle Occupancy	1.46		1.55		1.52		1.51		1.51		1.44		1.53	
Transit Trips	1,108	0.44%	666,951	3.94%	66,997	1.23%	15,668	0.43%	15,809	0.46%	9,244	0.64%	775,778	2.50%
Non-Motorized Person Trips	49,040	19.27%	2,202,802	13.00%	599,034	11.02%	422,132	11.70%	399,981	11.76%	169,541	11.81%	3,842,529	12.36%
Total Person Trips	**254,539**	**100%**	**16,948,769**	**100%**	**5,435,961**	**100%**	**3,607,453**	**100%**	**3,401,462**	**100%**	**1,435,662**	**100%**	**31,083,847**	**100%**
Off-Peak Periods	**Imperial**		**Los Angeles**		**Orange**		**Riverside**		**San Bernardino**		**Ventura**		**Total**	
Vehicle Trips	143,939	60.31%	10,079,155	56.78%	3,499,004	61.08%	2,285,814	62.64%	2,170,473	62.83%	951,146	64.34%	19,129,531	59.22%
Drive Alone	112,906	47.30%	7,353,031	41.42%	2,618,902	45.72%	1,739,082	47.65%	1,655,226	47.92%	744,053	50.33%	14,223,200	44.03%
2 Person Carpool	17,634	7.39%	1,299,284	7.32%	438,804	7.66%	287,580	7.88%	269,418	7.80%	110,084	7.45%	2,422,803	7.50%
3+ Person Carpool	13,399	5.61%	1,426,841	8.04%	441,298	7.70%	259,152	7.10%	245,829	7.12%	97,009	6.56%	2,483,528	7.69%
Auto Passenger Trips	52,687	22.07%	5,049,993	28.45%	1,602,594	27.98%	979,331	26.84%	925,687	26.80%	364,245	24.64%	8,974,537	27.78%
Vehicle Occupancy	1.37		1.50		1.46		1.43		1.43		1.38		1.47	
Transit Trips	895	0.37%	448,263	2.53%	44,926	0.78%	12,146	0.33%	12,238	0.35%	6,553	0.44%	525,020	1.63%
Non-Motorized Person Trips	41,161	17.25%	2,173,934	12.25%	582,113	10.16%	372,057	10.20%	346,032	10.02%	156,405	10.58%	3,671,702	11.37%
Total Person Trips	**238,682**	**100%**	**17,751,345**	**100%**	**5,728,637**	**100%**	**3,649,348**	**100%**	**3,454,429**	**100%**	**1,478,349**	**100%**	**32,300,790**	**100%**

Table 6-20: Year 2012 Mode Choice Summary Statistics (continued)

All Time Periods	Imperial		Los Angeles		Orange		Riverside		San Bernardino		Ventura		Total	
Vehicle Trips	284,154	58.14%	19,171,354	55.60%	6,643,060	60.08%	4,383,082	61.26%	4,151,511	61.21%	1,822,208	63.12%	36,455,369	58.00%
Drive Alone	216,315	44.26%	13,742,388	39.86%	4,886,835	44.19%	3,256,319	45.51%	3,080,622	45.42%	1,402,414	48.58%	26,584,892	42.30%
2 Person Carpool	37,963	7.77%	2,585,525	7.50%	873,067	7.90%	585,150	8.18%	553,044	8.15%	221,460	7.67%	4,856,207	7.73%
3+ Person Carpool	29,876	6.11%	2,843,441	8.25%	883,158	7.99%	541,614	7.57%	517,845	7.63%	198,334	6.87%	5,014,269	7.98%
Auto Passenger Trips	112,355	22.99%	9,815,314	28.47%	3,121,807	28.23%	1,949,504	27.25%	1,857,096	27.38%	723,057	25.05%	17,579,133	27.97%
Vehicle Occupancy	1.40		1.51		1.47		1.44		1.45		1.40		1.48	
Transit Trips	2,003	0.41%	1,115,214	3.23%	111,923	1.01%	27,815	0.39%	28,046	0.41%	15,796	0.55%	1,300,798	2.07%
Non-Motorized Person Trips	90,201	18.46%	4,376,736	12.69%	1,181,147	10.68%	794,189	11.10%	746,013	11.00%	325,946	11.29%	7,514,232	11.96%
Total Person Trips	**488,714**	**100%**	**34,478,618**	**100%**	**11,057,937**	**100%**	**7,154,589**	**100%**	**6,782,666**	**100%**	**2,887,008**	**100%**	**62,849,531**	**100%**

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Chapter 7 - Heavy Duty Truck Model

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CHAPTER 7 – HEAVY DUTY TRUCK MODEL

Introduction

[3] This Chapter addresses the various elements of the Heavy Duty Truck (HDT) Model, including internal and external HDT trips, Port HDT trips and Intermodal HDT trips. Included is a description of the model inputs, an overview of the various model components, and a summary of the 2012 HDT Model results.

HDT Model Structure

Figure 7-1 provides a flow chart of the overall structure of the HDT model. The model forecasts trips for three HDT weight classes: light-heavy (8,500 to 14,000 lbs. gross vehicle weight (GVW); medium-heavy (14,001 to 33,000 lbs. GVW); and heavy-heavy (>33,000 lbs. GVW). The key components of the new HDT Model are the following:

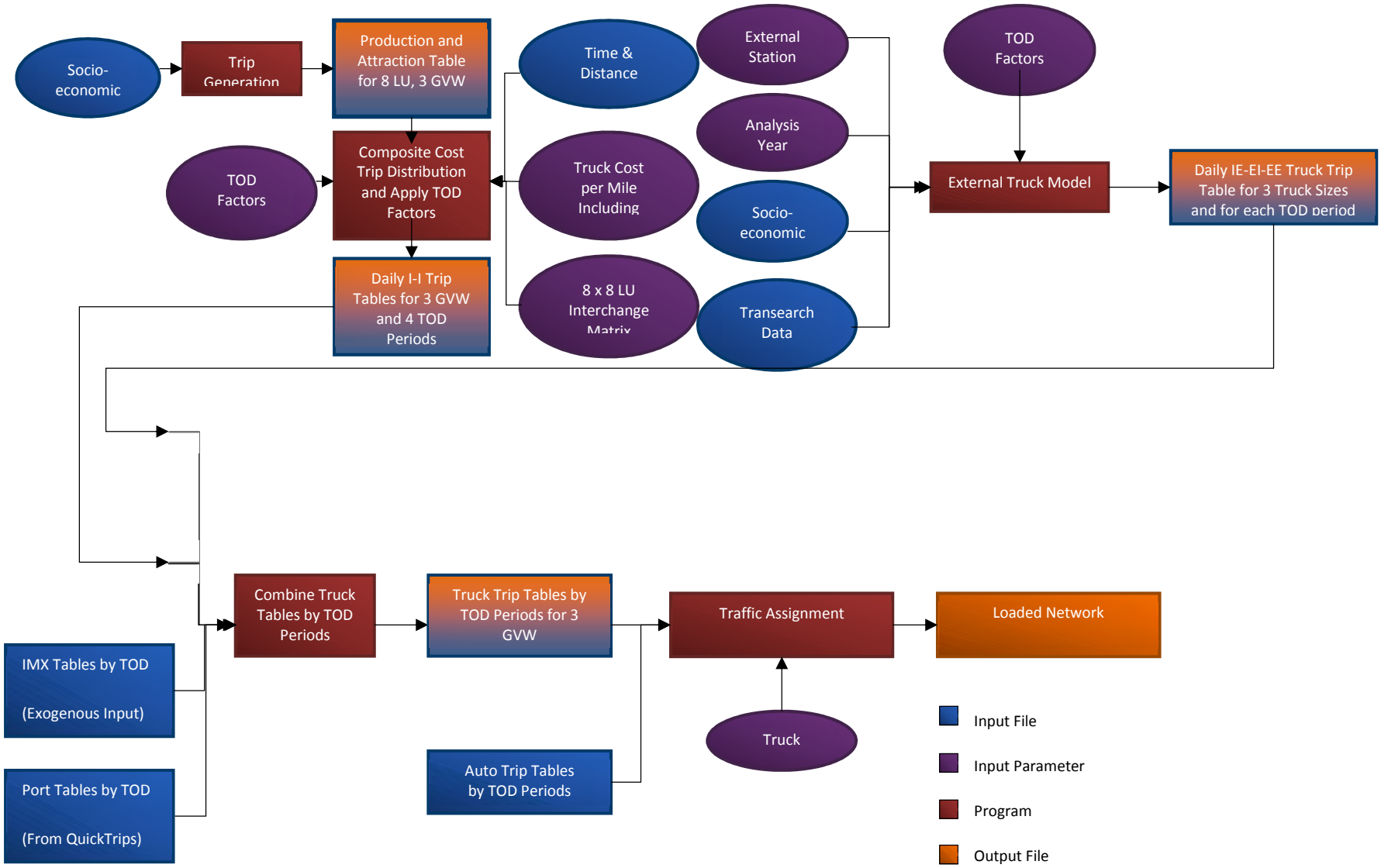
- ***External Trip Generation and Distribution Model.*** This component estimates the trip table for all interregional truck trips based on commodity flow patterns that link Southern California with the rest of the nation. The previous model used a commodity flow database obtained from outside sources, and included procedures for converting annual tonnage flows at the county level to daily truck trips at the TAZ level. The updated model replaces the older Caltrans Intermodal Transportation Management System (ITMS) commodity flow database with a new TRANSEARCH database from IHS/Global Insight. Adjustments were made to the TransCAD scripts that convert annual tonnage flows into daily truck trip tables. These modifications are a result of differences in data formats between TRANSEARCH and ITMS.

- ***Internal Trip Generation and Distribution Models.*** This component of the HDT Model estimates trip tables for intraregional trips. Trip generation is based on trip rates (number of trips per employee or household) for different land uses/industry sectors at the trip ends. This basic structure was retained, although all of the current trip rates were updated with new survey data. Other trip generation specifications (e.g., trip rates as a function of size of firm or more detailed industry/land use classifications) were reviewed, but it was determined that these specifications were not supported by currently available forecast data from SCAG.

  The trip distribution process was modified by developing a matrix of factors that indicate the trip interchange relationships among different land use types (i.e., what fraction of trips originating at a land use such as manufacturing sites go to warehouses vs. other manufacturing sites, etc.). The GPS survey data was used to develop a series of gravity models for each truck class. This offers some of the benefits of tour-based models by directing trips from zone to zone based on logical relationships amongst land use types without the extensive data requirements (typically difficult to collect from trip diary surveys) that are required to support development of a full tour-based model.

[3] Cambridge Systematics, Inc., *SCAG Task 4 Data Verification and Analysis – Final Report*, October 2010.

Figure 7-1: Final HDT Model Structure (TOD = Time-of-Day)



- ***Special Generator Trip Generation and Distribution Models.*** These models include the port model and the intermodal rail model. All of the input parameters to the port trip generation model were updated to reflect current port capacity improvements and throughput forecasts. This model update also implements a procedure to incorporate two types of secondary port truck trips. Transload secondary trips are cargo trips from intermediate handling locations (i.e., transloading sites where cargo is moved from international to domestic containers) to final destinations. Additionally there are secondary repositioning movements of trucks associated with port truck trips. These movements include trips made by trucks that originated at a port but do not immediately return to a port. Similarly, secondary repositioning movements also include trips that travel to a location from a non-port zone prior to traveling to a port. Secondary transload trips are distributed by the port model using a combination of a gravity model and an intermodal railyard model. Secondary repositioning trips are allocated to other zones in the region using the gravity model distribution.

- ***Trip Assignment.*** The model incorporates a multiclass assignment combining the truck trip tables with the passenger trip tables. Prior to assignment, the truck trip tables are converted to PCEs. The PCE factors were adapted from the Transportation Research Board (TRB) Highway Capacity Manual[4] (HCM), and are a function of the percent truck volume and length and steepness of grades. Five time periods are used to assign truck trips, consistent with the auto trip assignment. Updated time-of-day factors were developed using data from permanent classification count stations, weigh-in-motion (WIM), and vehicle classification counts.

Internal HDT Model

Internal HDT Trip Generation Model

The internal truck trip generation model is land use-based, where trip rates are multiplied by employment by industry sector to obtain internal truck trip productions and attractions. All the internal truck travel in the region is associated with ten broad but distinct land uses, namely, households, agriculture/mining/construction, retail, government, manufacturing, transportation/utility, general warehousing, high cube warehousing, wholesale, and other (service). The trip rates (i.e., truck trips per employee) were updated based on recent data collection efforts –establishment surveys and third-party truck GPS data. Trip rates for the general warehousing and high cube warehousing were updated using a combination of establishment surveys and independent trip generation studies.

Land Use and Socioeconomic Data

The socioeconomic data used by the Internal HDT Model is consistent with those data used by the passenger model, except that the employment data are stratified into more employment categories. The 22 two-digit NAICS categories of employment were mapped to 11 categories to account for truck trip generation similarities. This employment category mapping is shown in Table 7-1. These stratified employment types, plus households, support ten land use purposes for the HDT trip generation models: Households, Agriculture/Mining/Construction, Retail, Governments, Manufacturing, Transportation and Utility, General Warehousing, High Cube Warehousing, Wholesale, and Other (service). The warehousing land use categories were separated from the transportation and utility category using data from secondary establishment surveys and warehousing studies.

[4] Highway Capacity Manual. Volume 2: Uninterrupted Flow. Transportation Research Board: Washington D.C., 2010.

Table 7-1: Aggregated Two-Digit NAICS Categories

	Two-Digit	Two-Digit Description		Aggregate Categories for Trip Generation Models
1	11	Agriculture, Forestry, Fishing, and Hunting	1	Agriculture, Forestry, Fishing, and Hunting
2	21	Mining	2	Mining
3	22	Utilities	3	Utilities
4	23	Construction	4	Construction
5	31	Manufacturing	5	Manufacturing
6	42	Wholesale Trade	6	Wholesale Trade
7	44	Retail Trade	7	Retail Trade
8	45	Retail Trade	7	Retail Trade
9	48	Transportation and Warehousing	8	Transportation and Warehousing
10	49	Transportation and Warehousing	8	Transportation and Warehousing
11	51	Information Services	9	FIRES
12	52	Finance and Insurance	9	FIRES
13	53	Real Estates, and Rental and Leasing	9	FIRES
14	54	Professional, Scientific, and Technical Services	9	FIRES
15	55	Management of Companies and Enterprises	9	FIRES
16	56	Administrative and Support, and Waste Management and Remediation Services	9	FIRES
17	61	Educational Services	10	EDU
18	62	Health Care, and Social Assistance	9	FIRES
19	71	Arts, Entertainment, and Recreation	9	FIRES
20	72	Accommodation, and Food Services	9	FIRES
21	81	Other Services (Except Public Administration)	9	FIRES
22	92	Public Administration	11	GOVT

Note: FIRES - Finance/Insurance/Real Estate/Services, EDU – Educational, GOVT – Government.

Internal HDT Trip Rates

Trip rates derived from establishment surveys and GPS data for each truck type and land use are shown in Table 7-2. A second set of warehousing trip rates based on thousand square feet (KSF) is included to facilitate studies of proposed warehouses where only square footage data are available. All other rates are defined per employee.

Table 7-2: Internal HDT Trip Rates

Category	Light HDT Trip Rate	Medium HDT Trip Rate	Heavy HDT Trip Rate
Households	0.0147	0.0046	0.0072
Agriculture/Mining/Construction	0.0804	0.0778	0.0715
Retail	0.0663	0.0662	0.0703
Government	0.0296	0.0150	0.0148
Manufacturing	0.0613	0.0655	0.0924
Transportation/Utility	0.158	0.181	0.319
General Warehousing (Employment)	0.161	0.185	0.327

High Cube Warehousing (Employment)	0.184	0.211	0.372
General Warehousing (KSF)	0.2819	0.2434	0.5421
High Cube Warehousing (KSF)	0.0948	0.1272	0.3380
Wholesale	0.0916	0.0968	0.1316
Other (Service)	0.0095	0.0111	0.0151

Table 7-3 shows the 2012 HDT trip generation estimates. As expected, households in the region generate a high number of trip ends, especially for Light HDT. This is mostly due to the fact that land uses such as transportation and warehousing, utilities, service and retail deliver goods and provide services to residential neighborhoods. The largest HDT trip generator is the transportation and utility land use that includes trucks involved in power generation, water supply and sewage treatment, all kinds of transportation (trucking industry, taxi, and chartered services), and postal and courier services. The second highest generators of HDT trips are retail and manufacturing land uses, which account for a major share of employment in the region and serve the vast area and population of the six-county SCAG region.

Table 7-3: 2012 Internal HDT Trip Generation Estimates

Land Use	Light HDT Trip Ends	Medium HDT Trip Ends	Heavy HDT Trip Ends	Total Trip Ends	Percent of Total Trip Ends
Households	86,236	27,018	42,545	155,799	16%
Ag/Mining/Construction	30,611	29,634	27,246	87,491	9%
Retail	52,071	51,996	55,204	159,270	16%
Governments	7,710	3,922	3,855	15,487	2%
Manufacturing	40,302	43,051	60,796	144,149	15%
Transportation/Utility	55,393	63,672	112,215	231,279	24%
General Warehousing	7,591	8,729	15,418	31,738	3%
High Cube Warehousing	3,741	4,300	7,578	15,619	2%
Wholesale	34,208	36,159	49,147	119,513	12%
Other	2,990	3,484	4,748	11,222	1%
Total	**320,851**	**271,964**	**378,752**	**971,567**	

Internal HDT Trip Distribution Model

The trip distribution process was modified by developing a matrix of factors that indicate the trip interchange relationships among different land use types (i.e., what fraction of trips originating at a land use such as manufacturing sites go to warehouses vs. other manufacturing sites, etc.). The internal HDT trip distribution model uses a gravity formulation, stratified by land use type at both the production and the attraction end of the trip. This results in a total of 100 gravity models for each truck type: Light-Heavy Duty Truck (LHDT), Medium-Heavy Duty Truck (MHDT) and Heavy-Heavy Duty Truck (HHDT). After trip distribution, the 100 different trip matrices are combined into a single matrix for each truck type, so that only three matrices are passed on to time-of-day factoring and trip assignment.

Truck trips are distributed using composite cost impedances that account for time and distance-based monetary costs in addition to travel time. Based on a review of the literature, the appropriate distance-based costs for the SCAG model are identified in a report commissioned by the Minnesota Department

of Transportation (DOT)[5]. These costs account for fuel, tires, maintenance and repair, and depreciation.

The link composite cost is calculated as shown in the equation below. The corresponding unit costs are shown in Table 7-4.

*Composite Cost = Cost per hour * Congested time +*
*[Fuel Price / Fuel efficiency + Cost per mile (excluding fuel)] * Distance*

Table 7-4: Composite Truck Unit Costs

Truck Type	Cost per Hour	Fuel Efficiency (MPG)	Cost per Mile (excluding fuel)	Fuel Price per Gallon (a)
LHDT	$14.31	8.5	$0.14	$4.08
MHDT	$19.86	7.0	$0.24	$4.21 (b)
HHDT	$19.86	6.0	$0.27	$4.21 (b)

(a) Assumes all MHDT and HHDT trucks are diesel a fleet mix of 60% gasoline and 40% diesel powered trucks for LHDT.

(b) Fuel prices based on average 2012 California gasoline and diesel prices.

The GPS survey of truck trips provided the data to calibrate the model friction factors. These data were used to build observed truck trip flow matrices, stratified by truck type (LHDT, MHDT and HHDT). The TransCAD gravity model calibration utility was used to calibrate the fraction factors that best matched the observed truck flow matrices, given the composite cost impedances and land-use based trip productions and attractions. Figures 7-2 to 7-4 show the trip length calibration performed for the 2008 HDT model update, respectively for each truck class. Model parameters calibrated for the 2008 base year have been retained in the 2012 base year model.

[5] Levinson, David Matthew, Corbett, Michael J. and Hashami, Maryam, *Operating Costs for Trucks*, (2005) http://papers.ssrn.com/sol3/Delivery.cfm/SSRN_ID1736159_code807532.pdf?abstractid=1736159&mirid=1.

Figure 7-2 LHDT Internal Truck Trip Length Calibration

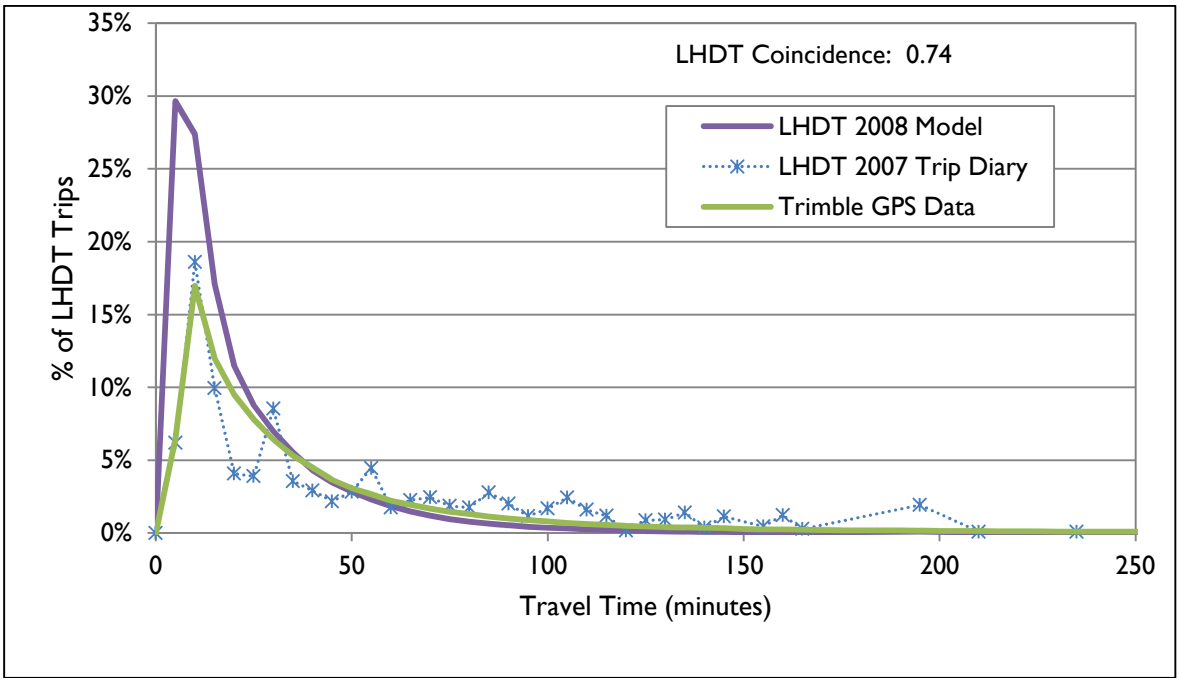


Figure 7-3 MHDT Internal Truck Trip Length Calibration

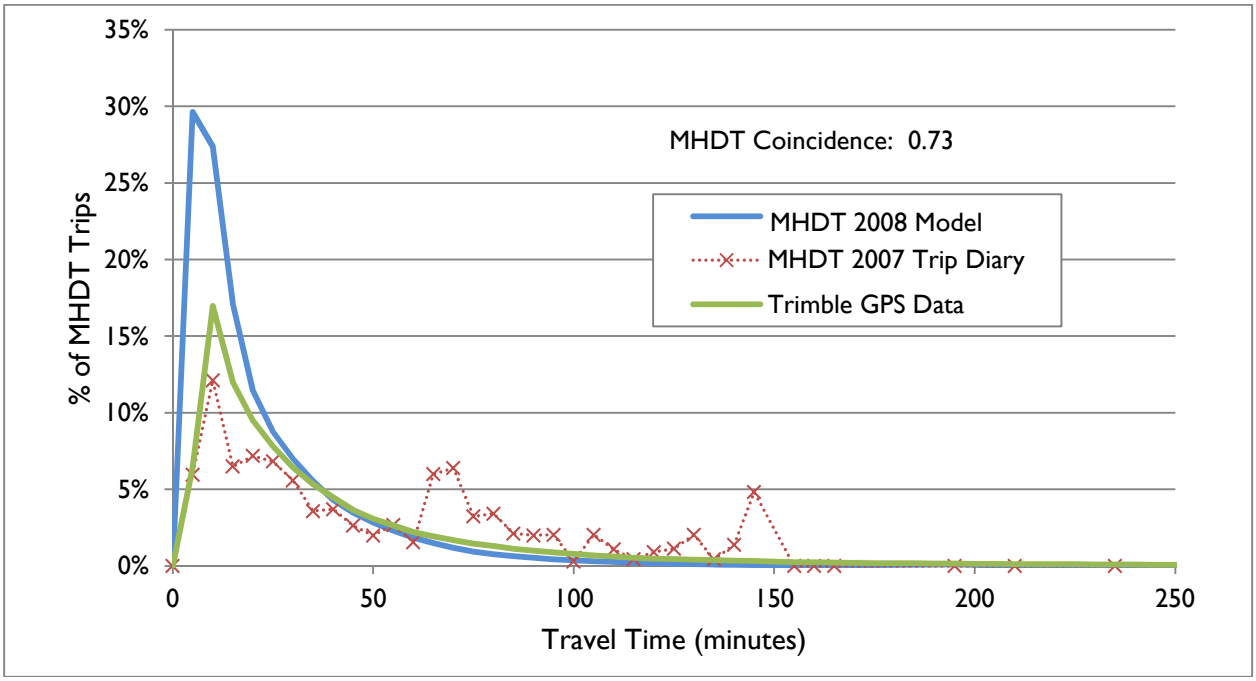
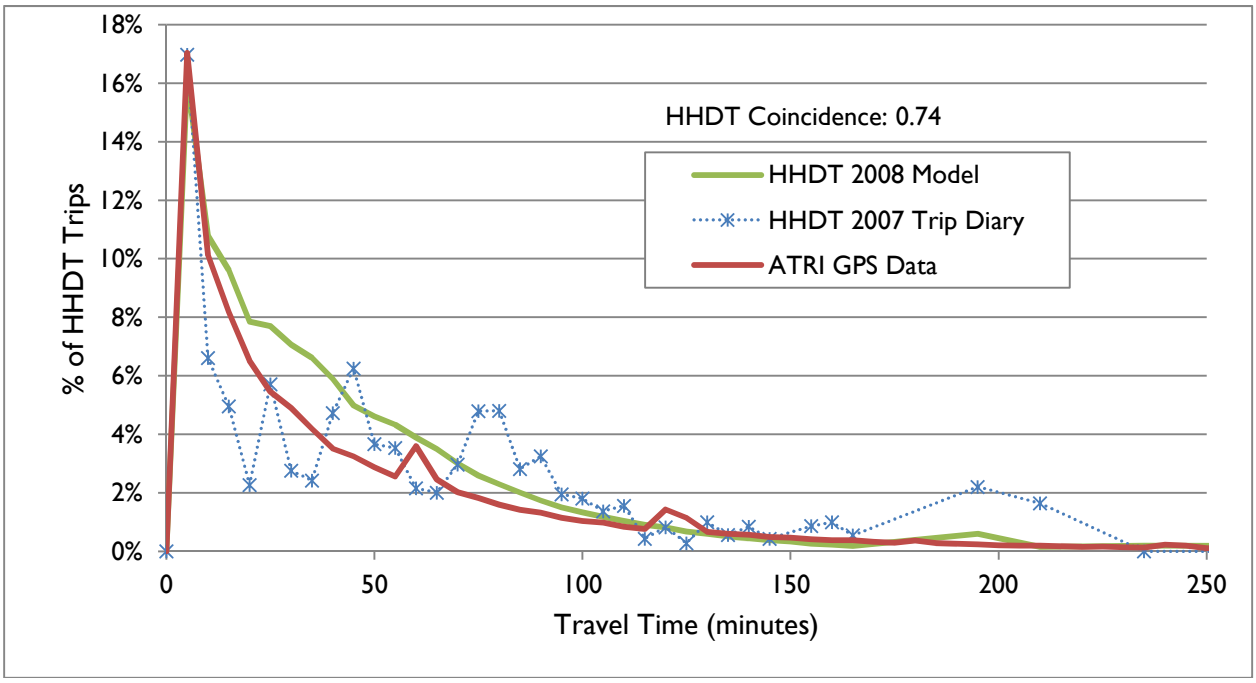


Figure 7-4 HHDT Internal Truck Trip Length Calibration



External HDT Model

The external HDT Model consists of internal-external and external-internal truck trips, and external-external (EE) truck trips. The IE/EI HDT trips are generated and distributed using a combination of commodity flow data at the county level and 2-digit NAICS employment data for allocating county data to TAZs. Growth factors developed using the commodity flow data at a county level and external cordon are used to forecast future year external HDT trips from the base year trip flow matrices.

The external HDT Model is based on the 2007 TRANSEARCH commodity flow table. The TRANSEARCH data are provided as annual flows in tons and are converted to daily weekday flows using an annualization factor of 306 (6 days per week for 51 weeks) for all commodities. The flows are converted from tons to trucks using the payload factors shown in Table 7-5. These payload factors were developed using data from the 2002 Vehicle Inventory and Use Survey (VIUS).

The methodology that converts commodity flows to annual HDT trips at the TAZ level is described below for various direction, commodity and shipment type combinations.

Outbound Truck Load (TL) and Private Carrier Shipments

The external trip end of the outbound commodity flows are allocated to external cordon stations using survey data from the SCAG region. The internal trip end of the outbound commodity flows is disaggregated from counties to TAZs based on shares of employment in the manufacturing, agricultural, mining industries, or warehousing land use acreage, depending on the type of commodity.

Inbound Truck Load and Private Carrier Shipments

The external trip end of the inbound commodity flows are allocated to cordon stations as described above for outbound flows. To establish the internal TAZ trip end, flows of each commodity destined to warehouses are estimated using Reebie data, and then disaggregated to TAZs based on the share of warehousing land use acreage. The remaining non-warehouse destination flows are assumed to be destined directly to manufacturing facilities. To disaggregate these flows, the fraction of each commodity consumed by different industries is determined using an Input-Output table, and then disaggregated to TAZs based on shares of employment in the corresponding industry.

Less than Truck Load (LTL) Shipments

SCAG inbound and outbound LTL shipments typically move through LTL terminals at the origin and destination so the same methodology is used for both directions. Also, since LTL shipments could carry any commodity, the approach is the same for all commodities. Truck load payload factors are used because payloads for LTL shipments cannot be determined (each LTL shipment carries many commodities with varying payloads). The external trip end of the LTL commodity flow is allocated to cordon stations as described above for truck load shipments. The internal trip end is disaggregated from county to TAZ based on the share of LTL trucking employment.

Table 7-5: External HDT Commodity Payload Factors

Commodity		Payload Factors (Tons per Truck)		
STCC	Description	LHDT	MHDT	HHDT
1	Farm Products	1	2	16
8	Forest Products	3	6	14
9	Fresh Fish or Other Marine Products	2	2	10
10	Metallic Ores	3	3	24
11	Coal	3	3	18
13	Crude Petroleum, Natural Gas, or Gasoline	3	6	15
14	Non-metallic Minerals	4	5	16
19	Ordinance or Accessories	2	5	14
20	Food or Kindred Products	3	4	15
21	Tobacco Products, excluding Insecticides	3	6	15
22	Textile Mill Products	1	4	11
23	Apparel or Other Finished Textile Products	5	6	9
24	Lumber or Wood Products, excluding Furniture	4	6	16
25	Furniture or Fixtures	2	3	9
26	Pulp, Paper, or Allied Products	2	7	13
27	Printed Matter	2	7	15
28	Chemicals or Allied Products	2	5	14
29	Petroleum or Coal Products	3	6	11
30	Rubber or Miscellaneous Plastics Products	3	5	12
31	Leather or Leather Products	3	6	13
32	Clay, Concrete, Glass, or Stone Products	3	7	14
33	Primary Metal Products	5	6	15
34	Fabricated Metal Products	5	5	11
35	Machinery, excluding Electrical	2	3	9
36	Electrical Machinery, Equipment, or Supplies	2	5	8
37	Transportation Equipment	2	7	11
38	Instruments, Photographic Goods, Optical Goods, Watches, or Clocks	2	4	10
39	Miscellaneous Products of Manufacturing	2	6	8
40	Waste or Scrap Materials	2	3	14
43	Mail	3	4	14
44	Freight Forwarder Traffic	3	1	7
45	Shipper Association or Similar Traffic	3	6	9
46	Freight All Kinds	3	5	12
47	Small Packages, LTC or LTL	3	6	10
48	Waste Hazardous Materials or Waste Hazardous Substances	3	6	15

Note: STCC – Standard Transportation Commodity Classification

External – External HDT Trips

The 2007 TRANSEARCH data identify EE truck freight flows passing through the SCAG region. To assign the cordon station to each EE trip end, a method similar to the one used for the external end of the IE/EI trips was used.

Empty Truck Trips

To account for all external truck trips in the SCAG region, empty truck are added to the loaded truck trips estimated from the commodity flows. Empty truck trip percentages at each external cordon location were generated from survey data. Assuming the empty truck fractions to be the same for all O-D pairs for an external cordon, empty truck trips are added to the loaded truck trips between SCAG TAZs and external TAZs.

Port HDT Model

Ports TAZ Development

The SCAG Tier 1 Zone System consists of 4,192 TAZs, including 42 TAZs that represent the Ports areas. The Port HDT Model was updated to use a more refined set of port TAZs, developed by the Ports of Los Angeles and Long Beach. This zone system, called Port TAM, includes a total of 90 Port area TAZs, for a total of 4,253 Tier 1 TAZs. Table 7-6 below provides a summary breakdown of the 4,253 TAZ system.

Table 7-6: PortTAM 4,253 TAZ System

from Zone ID	To Zone ID	Zone Type	Total
1	4109	Internal zones	4,109
4110	4149	External zones	40
4150	4161	Airport zones	12
4162	4251	Port zones	90
4251	4253	Extra zones	2
Total Zones			**4,253**

Terminal Gate Surveys

Origin-destination truck surveys were conducted in early 2010 at the Ports of Los Angeles and Long Beach Marine Terminals. The marine terminals are distribution points where international cargo is loaded onto trucks and rail. The survey was conducted to obtain OD pattern information by truck type. Surveys were conducted at six Port of Long Beach terminals (ITS, PCT, LBCT, CUT, SSA, and HANJIN) and six Port of Los Angeles terminals (YTI, MAERSK, EVERGREEN, TRAPAC, YANG MING, and APL).

A total of 23,030 survey sheets were distributed and 3,559 were returned. From the returned surveys, 2,981 origin trips were fully completed and geo-coded, and another 2,593 destination trips were also

fully completed and geo-coded for a total of 5,574 trips. Tables 7-7 and 7-8 present the survey sample origins and destinations by container type.

The marine terminal truck trips exhibited the following OD patterns:

- 12% traveled to the Ports areas & nearby locations
- 30% traveled to Gateway cities locations
- 20% traveled to off-dock yards
- 33% traveled to locations within the rest of the SCAG region
- Less than 5% traveled to out of state locations
- 98% of the off-dock intermodal yard traffic went to the four main intermodal yards (ICTF, Hobart, East LA, and LATC). Almost no traffic was recorded from yards at Industry and San Bernardino.

Table 7-7: Survey Sample Origins

Terminal	Bobtails	Chassis	Containers	Total
ITS	121	45	259	**425**
PCT	98	33	215	**346**
LBCT	165	14	282	**461**
CUT	94	45	151	**290**
SSA	75	26	73	**174**
HANJIN	142	13	198	**353**
YTI	9	3	21	**33**
MAERSK	107	31	80	**218**
EVERGREEN	59	21	104	**184**
TRAPAC	163	13	166	**342**
YANG MING	48	10	69	**127**
APL	13	1	14	**28**
Total	**1,094**	**255**	**1,632**	**2,981**

Table 7-8: Survey Sample Destinations

Terminal	Bobtails	Chassis	Containers	Total
ITS	116	22	246	**384**
PCT	77	22	173	**272**
LBCT	115	15	258	**388**
CUT	89	18	141	**248**
SSA	30	14	94	**138**
HANJIN	85	31	187	**303**
YTI	15	1	16	**32**
MAERSK	35	31	140	**206**
EVERGREEN	55	6	103	**164**
TRAPAC	86	14	213	**313**
YANG MING	23	10	81	**114**
APL	10	3	18	**31**
Total	**736**	**187**	**1670**	**2,593**

Port Truck Trip Generation

The port trip generation model was developed in 2008 based on a detailed port area zone system and specialized trip generation rates for autos and trucks by type (Bobtail, Chassis, and Containers). Port truck trip generation has two components: 1) container terminal truck trips, and 2) non-container terminal truck trips.

Container Terminal Truck Trip Generation

The container terminal truck trip generation model for the ports is referred to as the QuickTrip Model. QuickTrip was originally developed for the Ports of Los Angeles and Long Beach. The Model includes detailed input variables such as mode split (rail versus truck moves), time-of-day factoring, weekend moves, empty return factors, and other characteristics that affect the number of trucks entering and exiting through the terminal gates. The relevant input data for each container terminal include the following:

- Peak monthly Twenty-Foot Equivalent Units (TEU) throughput.
- TEU-to-lift conversion factor: factor determining the average number of TEUs associated with each lift at the terminal.
- TEU land-side throughput distributions: percent of TEU throughput associated with on-dock intermodal imports, on-dock intermodal exports, off-dock intermodal imports, off-dock intermodal exports, local imports, local exports, empties, and trans-shipments across the wharf.
- Number of operating days during the week.
- Percent of throughput moved during each terminal operating shift (for the day, second and hoot shifts).

QuickTrip produces the following truck trip outputs for each terminal:

- Monthly gate transactions
- Peak week truck trip volume
- Daily truck trips, and truck trips by each hour of the day by type of truck trip (bobtail, chassis, container, empty), and direction (arrival at and departure from the terminal)

QuickTrip can be used to generate base as well as future year truck trips by truck type and direction for each terminal, using the model inputs described earlier for each specific year. The inputs that are particularly expected to change for different years include the peak monthly TEU throughput, and the TEU land-side throughput distributions (based on expected increase in on-dock intermodal capacity at the port terminals in the future). Additionally, the model has the capability to analyze the impacts of other port truck trip reduction strategies such as virtual container yards and off-peak truck diversions, using specific inputs associated with these strategies.

The Model was enhanced to allow the user to assess whether the estimated capacity of each rail yard has been exceeded. If so, traffic is iteratively re-allocated to other yards that are not over capacity. The enhanced model also allows the user to choose different efficiency factors, such as "percent double cycle trucks," for different off-dock yards. In the original version, the user had to use the same variables for the entire off-dock market.

Non-Container Terminal Truck Trip Generation

Non-container terminal truck trip generation estimates were also developed for the Ports as part of the Port truck trip generation process. This includes trips to and from all of the other types of marine terminals (automobile terminals, dry bulk terminals, liquid bulk terminals and break-bulk terminals). In addition, there are many non-terminal land uses located throughout the ports (e.g., administrative offices, recreation, commercial, government buildings) that potentially generate truck traffic.

Existing non-container terminal truck trips were developed by conducting a series of driveway and midblock truck counts throughout the Ports. A number of specific terminals were counted at their driveways, while other terminals and miscellaneous land use activities were reflected via the use of downstream roadway truck counts. In some cases, a roadway truck count was used to represent the trip generation of a group of non-container terminals and other land uses.

Port Trip Table Distribution

The zone to zone distribution of port truck trips is based on a fixed OD matrix. A detailed and comprehensive truck driver survey was undertaken by the ports at the marine container terminals. The survey was used to develop detailed origin-destination trip tables for use in the Port area travel demand model. The stated trip OD from every valid survey was correlated with the travel demand model TAZ system. The survey results were then used to develop port truck OD frequency distributions by truck type for use in the model. Distribution patterns were developed separately for arrival trips and departure trips for each terminal. A total of 15 Port Truck Trip Tables were developed (5 time periods by 3 vehicle classes): AM, MD, PM, EV and NT time periods, and Bobtails, Chassis and Container truck trips. The time periods are consistent with those used by the passenger model, but combine the night and evening periods into a single night time period. Empty container and loaded container truck types are combined into one truck type called container truck type.

For terminals with few or no observations (Pier C, YTI and APL) an average distribution of all surveyed records was used. Before creating survey frequency distribution vectors, survey sample trips were adjusted to exclude trips that have both OD within the same terminal.

Base Year Port Trip Tables Summary

Summaries of 2012 Port truck trips are shown in Tables 7-9 and 7-10.

Table 7-9: 2012 Port HDT Trips by Truck Type

Time Period	Bobtails	Chassis	Containers	Total
AM	1,339	415	1,858	3,612
MD	7,756	2,439	11,037	21,232
PM	3,669	1,159	5,248	10,076
EV	1,888	596	2,696	5,180
NT	2,832	895	4,045	7,772
Daily	**17,484**	**5,504**	**24,884**	**47,872**

Table 7-10: 2012 Port HDT Trips by Time Period and County

County	Time Period					
	AM	MD	PM	EV	NT	Total
Imperial	0	0	0	0	0	**0**
Los Angeles	3,276	19,752	9,430	4,846	7,269	**44,573**
Orange	108	475	206	106	159	**1,055**
Riverside	46	204	89	46	69	**455**
San Bernardino	153	675	295	153	230	**1,506**
Ventura	6	26	12	7	10	**62**
External Stations	23	100	44	23	34	**224**
Total	**3,612**	**21,233**	**10,076**	**5,182**	**7,772**	**47,875**
% of Daily Trips	**7.5%**	**44.4%**	**21.0%**	**10.8%**	**16.2%**	

Intermodal HDT Trips

Intermodal Trip Tables

Intermodal (IMX) trucks trips are heavy HDT movements generated at the six regional intermodal facilities in the SCAG region. These intermodal facilities are shown in Figure 7-5. The intermodal (IMX) trip tables were developed from the IMX surveys conducted for LACMTA in 2005[6]. These surveys collected the following data on truck movements at these facilities: total inbound and outbound trains by month, including origin, destination, and number of containers by type; weekly train schedule; number of "lifts" (loading/unloading rail cars) by month split by containers versus trailers; and gate transactions by day by type (inbound, outbound, loaded, empty and bobtail).

The data obtained from the six IMX terminals were used to put together matrices of annual shipment flows at the zip code level. Trips to or from the ports were excluded, as they are modeled by the Port HDT Model. Four customer data matrices were developed: TL inbound, TL outbound, LTL inbound, and LTL outbound. A summary of these truck movements is shown in Table 7-11. These truck trips were all assumed to be HHDTs. The daily truck trips were developed assuming an annualization factor of 306. A summary of the IMX daily trip tables by terminal and county, as derived from the 2005 IMX surveys, is presented in Table 7-12.

[6] Cambridge Systematics, Inc. LACMTA Cube Cargo Model Development. 2005.

Figure 7-5: Intermodal Facilities in the SCAG Region

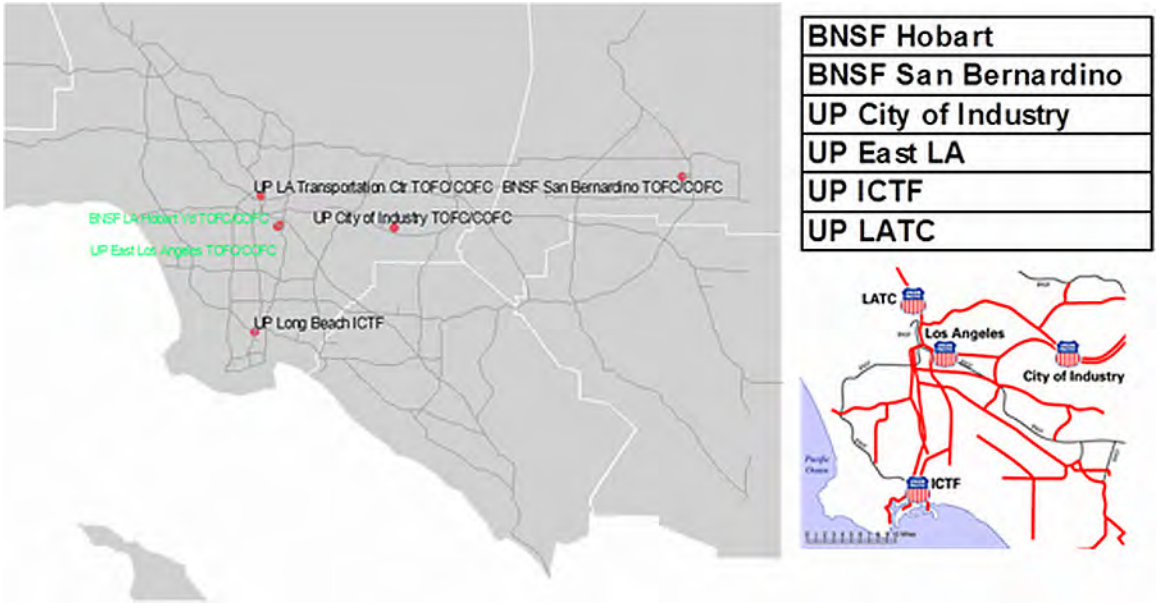


Table 7-11: 2005 Domestic IMX (Non-Port) Annual Truck Trips

Domestic	BNSF Hobart	BNSF San Bernardino	UP City of Industry	UP East LA	UP ICTF	UP LATC	Total
Inbound	444,204	433,333	93,789	96,757	2,463	21,812	1,092,357
TL/IMC	273,495	300,654	81,789	85,567	2,276	18,781	762,562
LTL	170,708	132,679	12,000	11,190	187	3,031	329,795
Outbound	445,011	458,677	78,431	69,837	662	21,353	1,073,970
TL/IMC	280,997	331,201	66,901	59,086	482	18,441	757,108
LTL	164,014	127,476	11,530	10,751	180	2,912	316,862
Total	889,214	892,009	172,220	166,594	3,125	43,165	2,166,327
TL/IMC	554,492	631,855	148,690	144,653	2,758	37,222	1,519,670
LTL	334,722	260,154	23,530	21,941	367	5,943	646,657

Table 7-12: 2012 Intermodal HHDT Trips by Terminal and County

IMX Terminal	IMX Terminal TAZ	Imperial	Los Angeles	Orange	Riverside	San Bernardino	Ventura	Grand Total	Share by Terminal
UP ICTF	1,360	0	9	1	1	1	0	**13**	**0%**
UP LATC	1,591	0	84	22	24	15	1	**147**	**2%**
BNSF Hobart	1,679	10	1,722	280	327	532	36	**2,905**	**40%**
UP East LA	1,702	2	322	110	78	73	4	**589**	**8%**
UP City of Industry	2,304	6	283	152	112	49	3	**606**	**8%**
BNSF San Bernardino	3,773	19	516	1,687	687	50	2	**2,961**	**41%**
Grand Total		**37**	**2,937**	**2,252**	**1,228**	**720**	**47**	**7,221**	
Share by County		**1%**	**41%**	**31%**	**17%**	**10%**	**1%**		

Secondary Transload HDT Trips

In addition to trips to and from the Ports and intermodal railyards, the PortTAM model accounts for secondary trips associated with transloading of container cargo. Transloading occurs when cargo in 20- and 40-foot international containers is moved to larger (usually 53-foot) domestic containers. The loaded domestic containers are drayed to intermodal railyards, trucked to other warehouse or wholesale locations, or trucked outside of the SCAG region.

The HDT model incorporates secondary transload trip tables generated by PortTAM. Transload studies show that 27% of all containers imported to the ports are transloaded and then transported to intermodal railyards, while 13% of imported containers are transloaded and transpoted to other zones within or outside of the SCAG region. The share of cargo transloaded to rail is expected to increase to 30% by 2035. The share of cargo that will be transloaded and transported to non-railyard facilities is expected to remain constant at 13%.

The trip tables passed from the PortTAM model to the SCAG HDT model include transloaded cargo, as well as empty container and bobtail trips required to support transloading of cargo.

Secondary Repositioning HDT Trips

The truck trip table generated by PortTAM (i.e., the Port, IMX, and transload models) include trips that have at least one end at a Port, transload, or intermodal zone. The trip tables generated by these trips give rise to additional secondary repositioning trips to and from these locations. For example, the first leg of an HDT trip chain would be from a port zone to a wholesale or warehouse facility, then the second leg would be from the wholesale or warehouse facility to a different TAZ in the six-county SCAG region. While some trucks may return directly to another port zone, this is not the case for all port-related trips. Secondary repositioning trips are calculated based on the imbalance of inbound and outbound port-related trucks in each TAZ.

Secondary repositioning trips are added to the internal truck trip tables after trip distribution, and therefore use distribution patterns consistent with the gravity model used for trip distribution. Table 7-13 presents a summary of the total wholesale HHDT trips in the region that are computed from three models – internal HDT, Port and IMX.

Table 7-13: 2012 Wholesale and Warehousing HDT Trips

Truck Type/PA	Internal HDT	Port Model HHDT	IMX HHDT Trips	Total Wholesale/Warehuose HHDT
LHDT Productions	34,208	n/a		
LHDT Attractions	34,208			
MHDT Productions	36,159			
MHDT Attractions	36,159			
HHDT Productions	49,147	12,885	3,405	65,437
HHDT Attractions	49,147	12,254	3,570	64,971

HDT Time-of-Day Factoring & Assignment

The HDT Model uses fixed time-of-day factors derived from observed truck counts. The HDT time of time periods are consistent with the passenger model periods, namely:

- AM Peak: 6:00 AM – 9:00 AM
- Mid-day: 9:00 AM - 3:00 PM
- PM Peak: 3:00 PM - 7:00 PM
- Evening: 7:00 PM – 9:00 PM
- Night: 9:00 PM – 6:00 AM

The HDT diurnal factors were derived from the 2007 Vehicle Travel Information System (VTRIS)[7] database. VTRIS is maintained by the FHWA Office of Highway Policy Information to track traffic trends, vehicle distributions and weight of vehicles to meet data needs specified in highway legislation. The VTRIS database contains truck classification counts spanning nearly half a year at many locations on SCAG interstate and state highways. The HDT time of day factors are shown in Table 7-14.

Table 7-14: HDT Time-of-Day Factors

Time Period	Diurnal Factors		
	LHDT	MHDT	HHDT
AM Peak (6 AM - 9AM)	18.8%	18.0%	13.9%
Midday (9 AM-3PM)	42.9%	46.5%	35.3%
PM Peak (3 PM- 7PM)	20.3%	15.5%	16.7%
Evening (7 PM - 9 PM)	4.8%	3.5%	7.2%
Night (9 PM - 6AM)	13.2%	16.5%	26.9%

HDT trips are assigned simultaneously with the auto trips as part of a user equilibrium multiclass assignment. The assignment methodology is described in detail in Chapter 8 – Trip Assignment. Truck volumes are converted to PCEs following the procedures recommended in the 2010 Highway Capacity Manual. The PCE factors are a function of grade, length of the climb segment, and percent of truck volume, and vary by truck type (LHDT, MHDT and HHDT). These factors are shown in Table 7-15.

[7] http://www.fhwa.dot.gov/ohim/ohimvtis.cfm

Table 7-15: HDT Passenger Car Equivalent Factors

Percent Trucks	Length of Grade in miles	Light -Heavy				Medium-Heavy				Heavy-Heavy			
		% Grade				% Grade				% Grade			
		< 2	2 - 4	4 - 6	> 6	< 2	2 - 4	4 - 6	> 6	< 2	2 - 4	4 - 6	> 6
0-5%	< 1	1.3	1.5	3.0	4.0	1.5	2.0	3.5	5.0	2.5	2.5	4.5	6.0
	1 - 2	1.3	2.5	4.0	5.0	1.5	3.5	5.0	6.5	2.5	5.0	7.5	12.5
	> 2	1.3	2.5	4.0	5.0	1.5	3.5	5.0	6.5	2.5	5.0	7.5	12.5
5-10%	< 1	1.3	1.5	2.5	3.0	1.5	2.0	3.0	4.0	2.5	2.5	4.5	5.5
	1 - 2	1.3	2.0	3.5	4.0	1.5	3.0	4.0	5.5	2.5	4.0	8.0	11.5
	> 2	1.3	2.0	3.5	4.0	1.5	3.0	4.0	5.5	2.5	4.0	8.0	11.5
>10%	< 1	1.3	1.5	2.0	2.5	1.5	2.0	2.5	3.0	2.5	2.5	4.0	4.0
	1 - 2	1.3	2.0	3.0	3.5	1.5	2.5	3.5	4.0	2.5	3.5	6.0	9.0
	> 2	1.3	2.0	3.0	3.5	1.5	2.5	3.5	4.0	2.5	3.5	6.0	9.0

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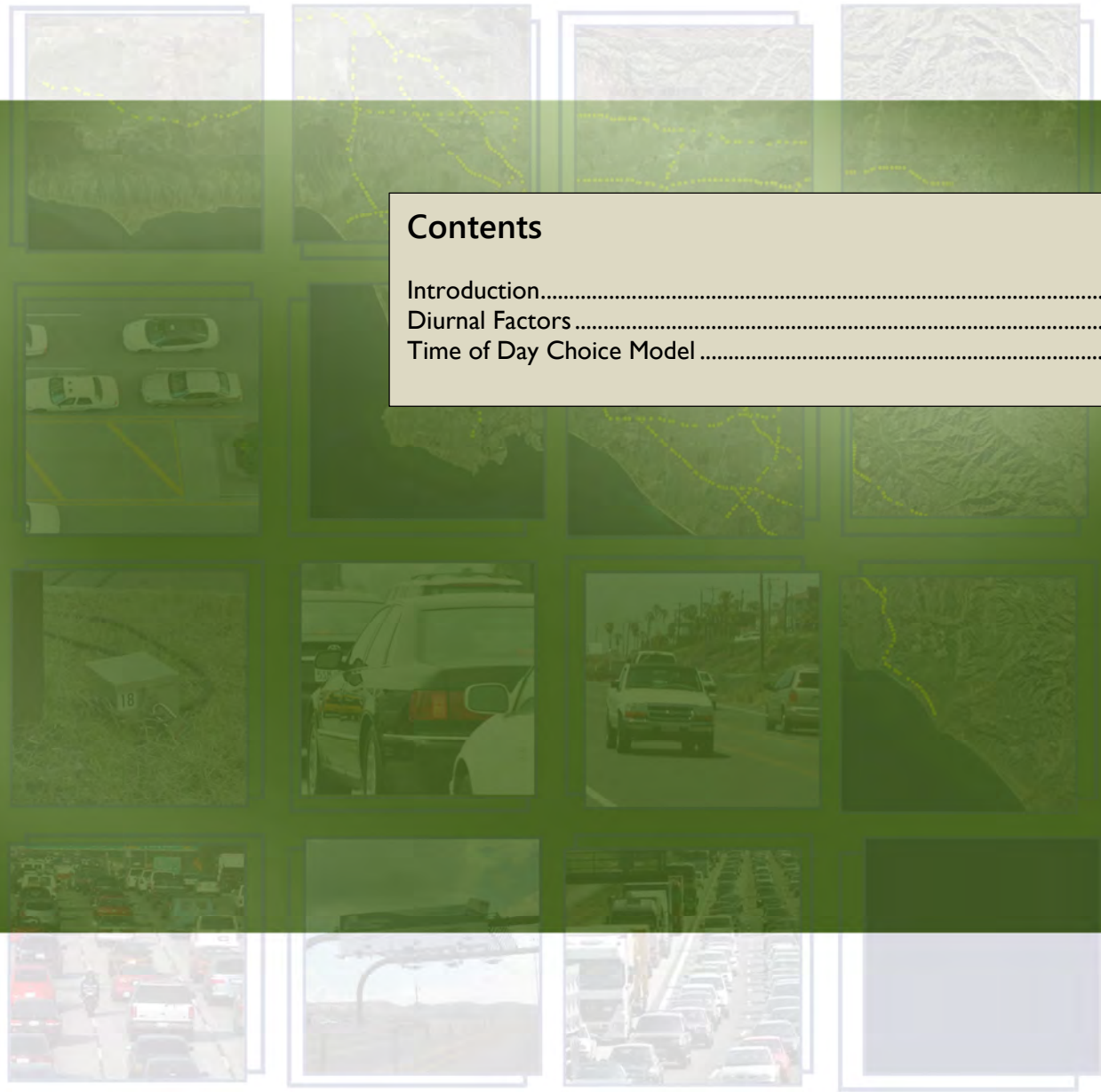
Chapter 8 – Time of Day Choice



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CHAPTER 8 – TIME OF DAY CHOICE

Introduction

This Chapter describes the methodologies available to segment the peak and off-peak demand into finer time periods, in preparation for assigning the auto trips to the highway network.

In the highway assignment, vehicle trips for all trip purposes are assigned, or loaded, onto each of five time period highway networks. The five time periods are:

- AM Peak (AM) - 6:00 AM to 9:00 AM,
- Midday (MD) - 9:00 AM to 3:00 PM,
- PM Peak (PM) - 3:00 PM to 7:00 PM,
- Evening (EV) - 7:00 PM to 9:00 PM, and
- Night (NT) - 9:00 PM to 6:00 AM.

Prior to assignment, the mode choice output is converted from peak/off-peak production-attraction (PA) format to time-of-day OD format. Two procedures are available to accomplish this conversion. The standard procedure, employed for the 2016 RTP/SCS development, is based on trips-in-motion diurnal factors. The second, optional procedure is based on a time-of-day choice model. Both procedures are described next.

Diurnal Factors

Trips-in-motion diurnal factors were derived from the 2012 California Household Travel Survey. These diurnal factors allocate the production-attraction trips by purpose to each of the five time periods. There are two sets of factors. The first set is applied at the end of trip generation to subdivide trips by purpose into "peak" and "off-peak" categories prior to the application of the trip distribution model. These factors are shown in Table 8-1. The second set is applied prior to trip assignment to allocate peak trips into the AM and PM peak periods by direction of travel, and off-peak trips into MD, EV and NT by direction of travel. These factors are displayed in Table 8-2. Once all of the factors are applied, OD trip tables by mode are summed for all trip purposes, combined with the internal-external, external-external and heavy duty truck trips, and then assigned by time period.

Table 8-1: Peaking Factors

Trip Purpose	Peak	Off-Peak
HBWD	0.6628	0.3372
HBWS	0.6224	0.3776
HBCU	0.5483	0.4517
HBSC	0.7390	0.2610
HBSH	0.4042	0.5958
HBSR	0.3574	0.6426
HBSP	0.6497	0.3503
HBO	0.4451	0.5549
WBO	0.5353	0.4647
OBO	0.4350	0.5651

Table 8-2: Time-of-Day Factors

Trip Purpose	Peak Period				Off Peak Period					
	AM		PM		MD		EV		NT	
	PA	AP	PA	AP	PA	AP	PA	AP	PA	AP
HBWD	45.0	1.4	3.4	50.3	27.5	18.2	1.5	15.2	24.3	13.6
HBWS_HBI	29.7	0.2	2.4	67.6	27.8	14.5	0.1	30.1	7.6	19.9
HBWS_IBW	33.4	1.4	3.4	61.8	34.0	45.7	0.7	8.8	7.4	3.4
HBCU	47.9	1.2	18.3	31.3	34.3	31.3	0.2	13.8	1.9	18.5
HBSC	68.8	0.0	1.0	30.2	8.7	82.0	0.8	4.5	1.3	2.6
HBSH	12.5	2.8	23.8	60.9	35.8	35.1	5.5	13.0	3.3	7.4
HBSR	16.8	2.2	37.9	43.0	27.7	15.0	5.4	17.7	5.3	28.9
HBSP	36.8	14.0	17.0	32.1	38.8	29.6	3.8	9.3	7.5	10.9
HBO	29.0	3.2	25.8	42.1	41.5	30.3	4.1	10.1	4.1	9.9
WBO	5.3	26.9	62.7	5.1	60.4	26.5	5.4	0.6	2.9	4.1
OBO	11.5	11.5	38.5	38.5	40.4	40.4	5.8	5.8	3.9	3.9

Time of Day Choice Model

The time of day choice model was introduced to give the model system the ability to shift demand among time periods, in response for example to increasing peak period congestion, or due to variable time of day road pricing.

Model Specification

The time-of-day choice model is a multinomial logit model that estimates the probability that travelers choose a specific trip departure time based on the characteristics of the trips, the characteristics of the drivers, and the characteristics of the highway network. The models predict travel for 31 time periods, representing 30-minute time intervals from 6:00AM to 9:00PM, and an overnight time period.

The models were developed using the 2012 California Household Travel Survey. Other data used in the model estimation, such as distance and travel time skims, employment and population density, were obtained from a current, fully-equilibrated version of the SCAG travel demand model.

In total, nine models are developed, corresponding to each direction of the home-based trips (from home, to home), and one model for the non-home based trips. The HBSR and HBO trips are combined into a single purpose when applying the time of day choice model. The final segments are:

- Home-based work direct trips (HBWD) from home
- Home-based work direct trips (HBWD) to home
- Home-based work strategic trips (HBWS) from home
- Home-based work strategic trips (HBWS) to home
- Home-based shopping trips (HBSH) from home
- Home-based shopping trips (HBSH) to home
- Home-based other (HBO) from home

- Home-based other (HBO) to home
- Non-home-based other (OBO) trips

The utility that a trip chooses time interval *t* is given by:

$$U(t) = \alpha_t + \sum_{i=0}^{2} \beta^i \times Dist \times Shift^i \quad + \sum_{i=0}^{2} \gamma^i \times Delay \times Shift^i + \sum \delta^i \times A^i$$

That is, the likelihood of choosing a given time period is a function of the travel distance (*dist*), the travel time measured as delay relative to the travel time during the night time period (*delay*), and attributes of the tripmaker or trip such as household income, age, household size, mode, and population density of the origin or destination zone (*A*).

The distance and delay variables are interacted with shift variables, which measure the propensity to choose times earlier or later than the middle of the AM, PM, or MD time periods. Two shift variables are used, to measure the early and late shift relative to the middle interval, respectively. A positive coefficient on the early shift variables indicates that the trip is likely to shift early, while a positive coefficient on the late shift variable indicates that the trip is likely to shift late.

The following household, person and zone attributes were found to be significant:

- Median household income
  - Less than $35,000
  - $35,000 to $74,999
  - $75,000 to $149,999
  - $150,000 or more
- Average household size
- Median age of people living in the trip origin TAZ
- Origin TAZ population density
- Destination TAZ population density
- Origin CBD dummy
- Destination CBD dummy

The model estimation results indicate that, on the journey from home to work, the longer the distance between home and work, the earlier the chosen time interval, all else equal. The same effect of distance on time-of-day choice is observed on the journey from work to home. On the other hand, the effect of delay is to increase the likelihood of choosing intervals away from the peak interval within each peak period, as delay increases. That is, some trips will choose earlier travel times, while others will choose later travel times. No pattern emerged as to whether earlier times are generally preferable to later times, but clearly there is a response towards moving away from the most congested time interval.

Model Application

The nine time-of-day choice models developed are applied to their respective production-attraction (PA) matrices output from the mode choice model. The time of day split for HBSC, HBSP, HBU and WBO trips is performed using the diurnal factors described above.

Effect of Pricing on Time-of-Day Choice

Because there are few trips in the SCAG region that are currently exposed to tolls, the effect of road pricing on time of day choices was measured using a stated preference (SP) survey and models derived from these survey data.

The stated preference survey was administered in 2011 to 3,500 travelers in the SCAG region. Information about a recent auto trip was gathered from each respondent, and was used to customize a series of hypothetical scenarios where travelers were asked to choose a departure time period given choices characterized by different travel times and road prices.

The stated preference results were used to develop models to estimate the likelihood of shifting departure time when all alternative times are tolled. Time-of-day shift multinomial logit models were estimated for work commute trips, business-related trips and non-work trips. Table 8-3 shows the model estimation results.

Table 8-3: Time-of-Day Shift Models

Trip Segment	Alternative	Variable Coefficients				
		Travel Time (min)	Cost[1]	Time Shift Early	Time Shift Late	Constant
Work Commute	Travel in Peak	-0.0568	-2.2000			
	Travel Earlier			-0.0149		0.2340
	Travel Later				-0.0184	0.3830
Business Travel	Travel in Peak	-0.0481	-0.8320			
	Travel Earlier			-0.0134		0.0179
	Travel Later				-0.0090	0.2420
Non-Work Travel	Travel in Peak	-0.0309	-2.1800			
	Travel Earlier			-0.0083		0.3290
	Travel Later				-0.0077	0.7690

Within the model flow, the time-of-day choice models are applied first, followed by the time-of-day shift models. The former models are intended to predict the general propensity to choose a time period, while the latter predict the specific response given a variable road pricing schedule.

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CHAPTER 9 – TRIP ASSIGNMENT

Introduction

This Chapter describes the various trip assignment methodologies and 2012 validation results. Assignments used in the 2012 model include a static, multiclass user equilibrium highway assignment to the highway network, and a multi-path (Pathfinder) transit assignment to the transit network.

Highway assignment validation is one of the crucial steps in the modeling process. The ability of the model to produce base year volume estimates within acceptable ranges of tolerance compared to actual ground counts is essential to validate the entire travel demand model. The screenline analysis for the 2012 validation year is presented in this Chapter. Also, key to highway assignment validation is the comparison of model estimated VMT to estimates from the Highway Performance Monitoring System. An acceptable tolerance level is mandatory for regional air quality planning and conformity purposes. Specifics regarding the comparative analyses are summarized in this Chapter and assignment statistics for the SCAG region are also presented.

The multi-class highway assignment simultaneously loads the vehicle forecasted by the mode choice model, the internal-external and external-external vehicle trips, and the three classes of heavy duty trucks (light, medium and heavy). The OD trip tables loaded to the highway network include the following vehicle classes:

- Drive Alone
- Shared Ride 2 No HOV
- Shared Ride 3+ No HOV
- Shared Ride 2 HOV
- Shared Ride 3+ HOV
- Light Trucks
- Medium Trucks
- Heavy Trucks

The internal-external and external-external trips are included in the Drive Alone trip tables. The next section briefly describes the methodology used to generate these trips, while the rest of the chapter discuss the highway assignment process, validation results and transit assignment process.

External Trips

External trips (cordon trips) are trips with one or both ends outside the modeling area. External trips for the light-and-medium duty vehicles are estimated independently from heavy-duty vehicles (trucks). The following provides a brief description of the methodology used to estimate light-and-medium duty (auto) vehicle external trips.

Traffic counts were obtained for each cordon location to estimate Year 2012 cordon volumes. Previous cordon survey results were then used to split total external trips into: 1) through trips - External-to-External, and 2) External-to-Internal and Internal-to-External. The resulting through trip table (E-E) and the IE/EI trip table were combined with trip tables from previous steps to form final OD vehicle trip tables for highway assignment.

Highway Assignment Procedures

Highway assignment is the process of loading vehicles onto the appropriate highway facilities to produce traffic volumes, congested speeds, vehicle-miles traveled, and vehicle-hours traveled (VHT) estimates, for each of the five time periods. Link or segment assignments by time period are added to produce average daily traffic volumes (ADT) for the model network. The 2012 model assignments consist of a series of multi-class simultaneous equilibrium assignments for the eight classes of vehicles listed above, and for each of the five time periods. During the assignment process, trucks are converted to passenger-car equivalents for each link based on the percentage of trucks, grade, link length and level of congestion. Transit vehicles are pre-loaded to the highway links.

To achieve travel time convergence between the highway assignment and the demand model, a five loop feedback procedure is used in the 2012 model. The following describes the travel time feedback process:

- **Step 1**: Auto ownership, trip generation, trip distribution and mode choice are run using the speeds coded on the input highway networks. These coded speeds represent observed speeds, where available. The resulting trip tables for each vehicle class and time period are assigned to the highway networks, which yields the first pass loaded volumes and congested speeds.

- **Step 2**: These congested speeds are fed back into the demand model (auto ownership, trip generation, etc.) to produce a second set of congested speeds for the AM peak, PM peak, and midday periods. An averaging process is used to smooth the volume variation between the first and second pass assignments. These averaged speeds are again fed back to the demand model, and the process is repeated three more times for a total of five feedback loops.

- **Step 3**: During the final, 5th loop assignment, all highway assignments are performed: AM peak, midday, PM peak, evening and night time.

The averaging process used to smooth volume variations across feedback loops is the method of successive averages, with a 1/n step, where n is the number of iterations. Convergence for each assignment process (as opposed to model-wide convergence) is achieved when the bi-conjugate user equilibrium assignment achieves a relative gap of 0.001or 200 iterations, whichever occurs first.

Generalized Cost Function

The 2012 model uses a generalized cost function during highway assignment to measure and compare the travel time and cost associated with alternative highway paths. The equation of this cost function is as follows:

$$GenCost = travel\ time + HOT\ penalty + {(auto\ operating\ cost + tolls)}/{cost\ conversion\ factor}$$

Each of the terms of this equation in turn is calculated as follows:

a. Travel time is computed using volume-delay functions, described in detail in the next section

b. The tolls are a model input, specified by the user as appropriate

c. The high occupancy toll (HOT) lane penalty represents a perceived cost of accessing and exiting the HOT lanes. This penalty applies only when the toll flag identifies a HOT lane. It defaults to a value of 0.5 minutes per mile for drive alone vehicles, as shown in Table 9-1.

d. The auto operating cost measures the contribution of distance to the generalized cost; for 2012 the auto operating cost is 26.78 cents per mile (in constant $2011); its derivation is shown in Appendix B.

e. The cost conversion factor, which may be interpreted as a value of time, varies by vehicle class and time period, as shown in the equation and Table 9-1 below.

$$Cost\ conversion\ factor = Distance\ cost\ conversion\ factor * cost\ multiplier * VOT\ multiplier$$

Table 9-1: Generalized Cost Function Parameters

Vehicle Class	HOT Penalty (min/mile)	Distance Cost Conversion Factor ($/hr)		Time Period	Multiplier		VOT Multiplier				
					Auto Cost	Truck Cost	AM Toll/HOT	Midday Toll/HOT	Peak Toll/HOT	Evening Toll/HOT	Night Toll/HOT
Drive Alone	0	33.9		AM Peak	0.9	1	1.5/2.5	1.25/2	1.5/2.5	1.5/2.5	1/1.5
Shared Ride 2	0	40.5		Midday	0.55	1	1.5/2.5	1.25/2	1.5/2.5	1.5/2.5	1/1.5
Shared Ride 3+	0.2	40.5		PM Peak	0.75	1	1.5/2.5	1.25/2	1.5/2.5	1.5/2.5	1/1.5
Light-Duty Trucks	0	52.4		Evening	0.55	1	1	1	1	1	1
Medium Duty Trucks	0	65.8		Night	0.55	1	1	1	1	1	1
Heavy Duty Trucks	0	70.7					1	1	1	1	1

Volume-Delay Function

The volume delay function (VDF) utilized for the traffic assignment portion of the Regional Model is the Bureau of Public Roads (BPR) function. The volume-delay function is used in assignment to simulate the relationship between traffic volume, congestion delay, and congested speeds. The equation of the function is as follows:

$$t_i \cdot \left[1 + \alpha_i \left(\frac{x_i}{C_i} \right)^{\beta_i} \right]$$

where:

t_i	=	Free flow travel time on link i
C_i	=	Capacity of link i
x_i	=	Flow on link i
α	=	Constant
β	=	Constant

If $\frac{x_i}{C_i}$ <= 1 then β is set to the specific value of 5.0. If $\frac{x_i}{C_i}$ > 1, then α and β are set to values that vary by link facility type, posted speed, and area type according to the values in Table 9-2.

Table 9-2: Volume-Delay Function Parameters

Facility Type	Posted Speed	Area Type	Alpha	Beta
Freeways and HOV	All	All	0.60	8.0
Expressways	<=45mph	1-5	0.60	5.0
Expressways	<=45mph	6-7	0.60	6.0
Expressways	>45mph	All	0.60	8.0
All Others	All	1-5	0.60	5.0
All Others	All	6-7	0.60	6.0

Freeway on-ramps (facility types 82 and 84) have a separate volume-delay function. The function is as follows:

$$\frac{L_i}{FFS_i} + \frac{\left[\frac{PLPHx_i}{120} * 5.0 * \left(1 + \frac{x_i}{C_i} \right)^8 \right]}{60}$$

where:

L_i	=	Length on link i in miles
FFS_i	=	Free Flow Speed on link i in miles/hour
C_i	=	Capacity of link i
x_i	=	Flow on link i
$PLPHx_i$	=	Per-Lane-Per-Hour Flow on link i

HOV Diversion

A binomial diversion model is applied prior to highway assignment to split carpool trips between vehicles that use the HOV lanes and vehicles that remain on the general purpose flow lanes. The probability of choosing the HOV facility is given by the function below:

$$P(HOV) = \frac{b}{b + e^{at}}$$

Where t represents the travel time savings from using the HOV facility, $t = HOV\ time - GP\ time + access\ penalty$, and a and b are calibrating factors. The HOV access penalty measures the inconvenience of entering and exiting the lanes, given that many of them are buffer or barrier-separated with limited opportunities for access and egress. The access penalty is 5.0 minutes across all time periods. The calibrating factor a determines the steepness of the logistic curve, while b determines the likelihood of using the HOV lanes at zero travel time savings. To encourage carpool trips to stay on the HOV lanes, a factor of 1.1 is used on the mainline travel times. All the parameters of the HOV diversion function can be specified by time period, however, currently the same parameters are used for all time periods.

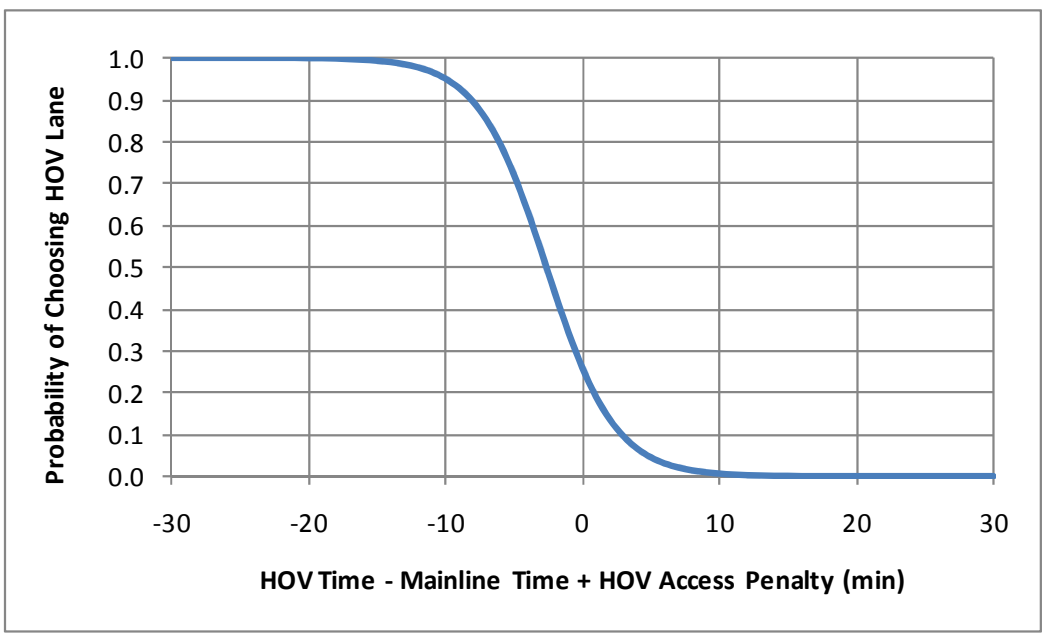


Figure 9-1: HOV Diversion Function

HPMS Factoring

After the entire model has converged, the estimated link volumes are factored prior to performing the emission calculations. Although the model achieves a good match to HPMS estimates without any factoring, as shown in the tables below, HPMS factoring is used to overcome the small remaining discrepancies and ensure consistency among the emission calculations and HPMS. The adjustment factors are calculated by comparing model VMT estimates to HPMS estimates by air basin, county and vehicle type (light vehicles and heavy duty trucks).

Highway Assignment Validation and Summary

This section describes how the 2012 Regional Model's highway trip assignment module has been validated to observed conditions. It includes results for Heavy Duty Truck and mixed-flow components of the trip assignment model. Figures 9-2 and 9-3 provide a visual representation of the SCAG regional screenlines.

Figure 9-2: Screenlines (Regional)

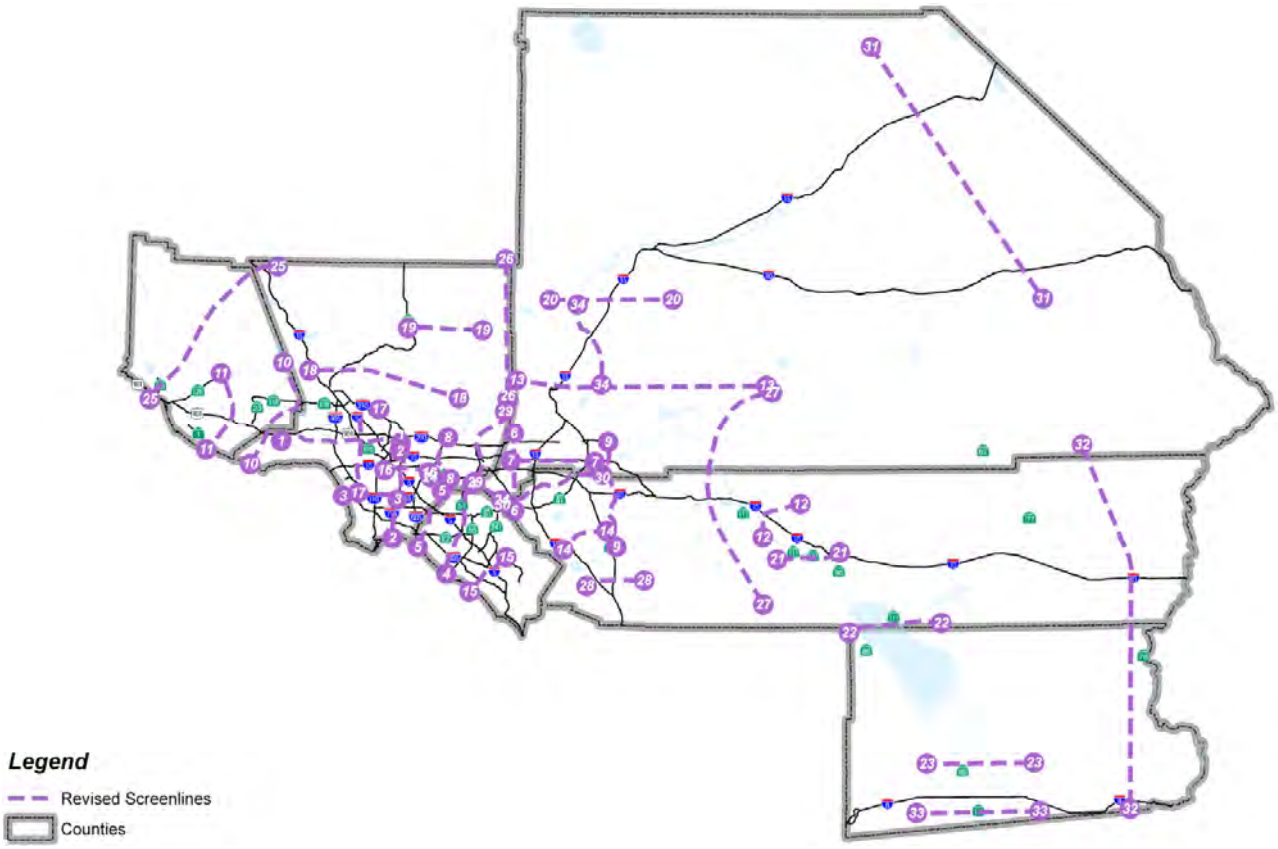
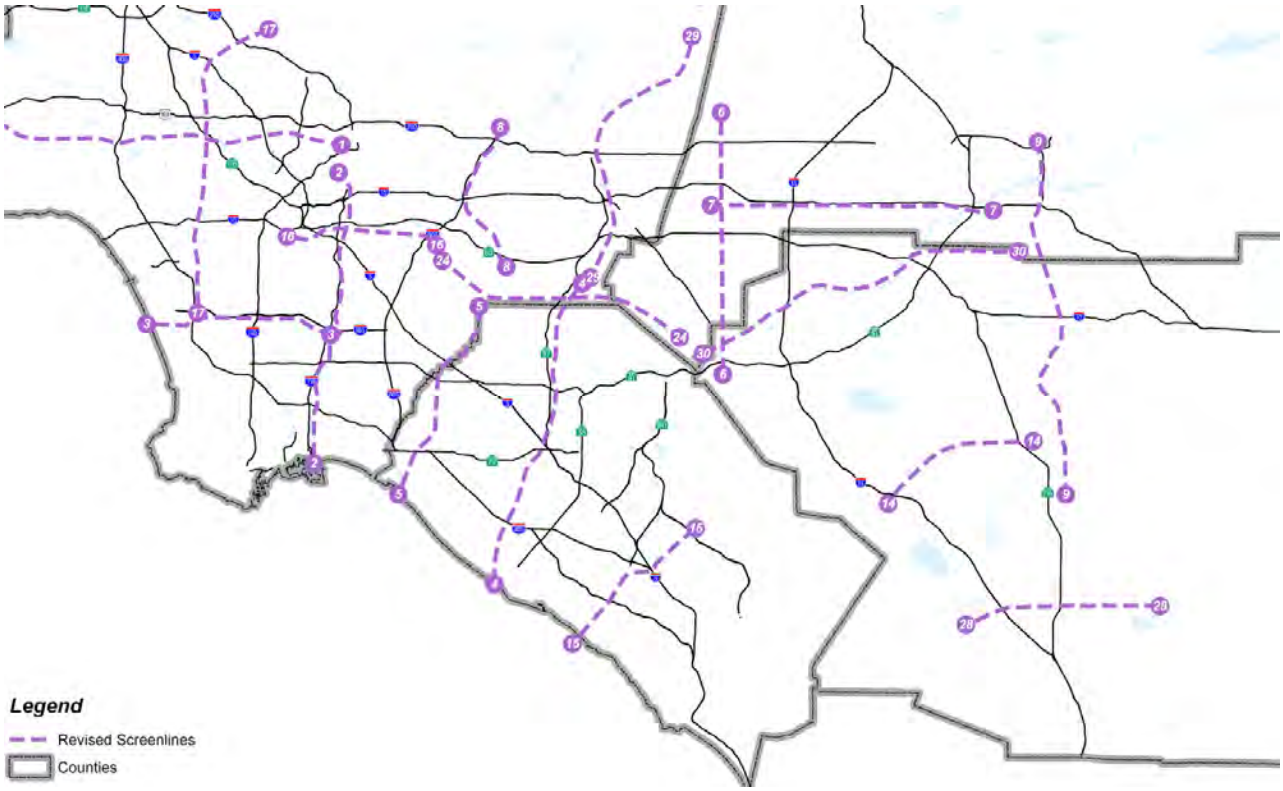


Figure 9-3: Screenlines (Detail)



Validation of the Mixed-Flow Trip Assignment Model

Tables 9-3 through 9-8 present an overview of the highway assignment statistics for each model time period and daily total. After the HPMS volume adjustment, the 2012 model forecasts 417,169,000 VMT on an average weekday in 2012 within the model area for light and medium duty vehicles. In addition, the model forecasts 30,425,000 VMT for heavy-duty vehicles in the expanded model area. The total for all vehicle types combined is 447,594,000 VMT.

A comparison of 2012 model speeds to PeMS speed data is shown in Figures 9-5 to 9-8.

Table 9-3: Year 2012 Loaded Highway Network Summary

From Assignment						
Light and Medium Duty Vehicles	**AM Peak**	**PM Peak**	**Midday**	**Evening**	**Night**	**Total**
Average Speed (mph)	32.3	30.3	37.7	42.7	48.6	**35.0**
Vehicle Miles Traveled (,000)	81,299	124,534	135,654	31,118	38,335	**410,940**
Vehicle Hours Traveled (,000)	2,517	4,113	3,596	728	789	**11,743**
Vehicle Hours Delay (,000)	726	1,307	529	50	5	**2,617**
Heavy Duty Vehicles	**AM PEAK**	**PM PEAK**	**Midday**	**Evening**	**Night**	**Total**
Average Speed (mph)	40.8	38.8	48.4	55.2	59.2	**47.4**
Vehicle Miles Traveled (,000)	4,392	5,165	11,285	1,903	6,713	**29,457**
Vehicle Hours Traveled (,000)	108	133	233	34	113	**622**
Vehicle Hours Delay (,000)	29	41	37	2	1	**110**
All Vehicles Combined	**AM PEAK**	**PM PEAK**	**Midday**	**Evening**	**Night**	**Total**
Average Speed (mph)	32.7	30.5	38.4	43.3	49.9	**35.6**
Vehicle Miles Traveled (,000)	85,691	129,699	146,939	33,020	45,048	**440,397**
Vehicle Hours Traveled (,000)	2,625	4,246	3,830	763	902	**12,365**
Vehicle Hours Delay (,000)	755	1,348	566	52	6	**2,727**
After HPMS Adjustment						
Light and Medium Duty Vehicles	**AM PEAK**	**PM PEAK**	**Midday**	**Evening**	**Night**	**Total**
Average Speed (mph)	33.0	31.2	38.3	42.9	48.1	**35.7**
Vehicle Miles Traveled (,000)	82,545	126,466	137,753	31,574	38,831	**417,169**
Vehicle Hours Traveled (,000)	2,498	4,050	3,600	736	808	**11,693**
Vehicle Hours Delay (,000)	665	1,158	452	43	2	**2,321**
Heavy Duty Vehicles	**AM PEAK**	**PM PEAK**	**Midday**	**Evening**	**Night**	**Total**
Average Speed (mph)	40.5	38.9	48.6	55.0	58.7	**47.3**
Vehicle Miles Traveled (,000)	4,549	5,343	11,628	1,964	6,941	**30,425**
Vehicle Hours Traveled (,000)	112	137	239	36	118	**643**
Vehicle Hours Delay (,000)	32	43	39	3	3	**120**
All Vehicles Combined	**AM PEAK**	**PM PEAK**	**Midday**	**Evening**	**Night**	**Total**
Average Speed (mph)	33.4	31.5	38.9	43.5	49.4	**36.3**
Vehicle Miles Traveled (,000)	87,094	131,809	149,381	33,538	45,772	**447,594**
Vehicle Hours Traveled (,000)	2,611	4,187	3,840	772	926	**12,336**
Vehicle Hours Delay (,000)	697	1,201	491	45	5	**2,440**

Table 9-4: Year 2012 VMT Comparison by County and by Air Basin (in Thousands)

County		VC SCCAB		SCAB		MDAB		SSAB		Total		County Total
		Auto	Truck	Auto	Truck	Auto	Truck	Auto	Truck	Auto	Truck	
Imperial	Model	-	-	-	-	-	-	4,221	520	4,221	520	4,740
	HPMS							4,466	796	4,466	796	5,261
Los Angeles	Model	-	-	202,147	12,847	7,259	348	-	-	209,406	13,195	222,601
	HPMS			204,952	11,581	8,470	605			213,422	12,186	225,608
Orange	Model	-	-	70,106	3,481	-	-	-	-	70,106	3,481	73,587
	HPMS			73,180	3,366					73,180	3,366	76,546
Riverside	Model	-	-	44,995	2,840	1,404	750	9,504	1,248	55,902	4,837	60,740
	HPMS			41,253	3,496	1,495	632	9,636	1,697	52,383	5,824	58,208
San Bernardino	Model	-	-	35,197	2,405	19,159	3,612	-	-	54,355	6,017	60,372
	HPMS			36,584	3,396	18,424	3,909			55,007	7,306	62,313
Ventura	Model	16,949	1,407	-	-	-	-	-	-	16,949	1,407	18,356
	HPMS	18,719	954							18,719	954	19,673
Total	**Model**	**16,949**	**1,407**	**352,444**	**21,573**	**27,822**	**4,710**	**13,725**	**1,767**	**410,940**	**29,457**	**440,397**
	HPMS	**18,719**	**954**	**355,969**	**21,839**	**28,388**	**5,146**	**14,101**	**2,492**	**417,178**	**30,431**	**447,609**
	Ratio	**0.905**	**1.476**	**0.990**	**0.988**	**0.980**	**0.915**	**0.973**	**0.709**	**0.985**	**0.968**	**0.984**

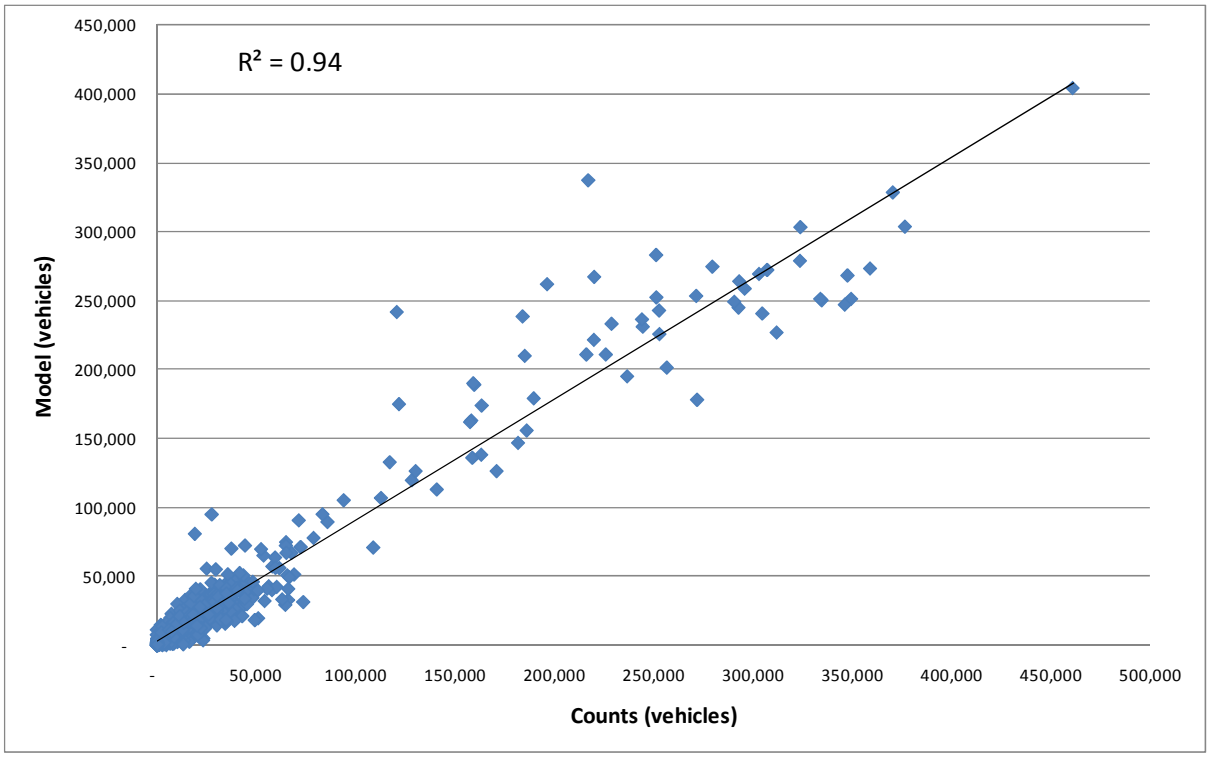


Figure 9-4: Year 2012 Screenline Location Volumes

Table 9-5: Year 2012 Screenline Comparison of Model Weekday ADT and Ground Counts

Screen line	Location	Direction	Obs	Light & Medium Duty Vehicles				Heavy Duty Vehicles				Total		
				Model	Count	Ratio	RMSE	Model	Count	Ratio	RMSE	Model	Count	Ratio
1	Los Angeles	EW	36	1,643,333	1,438,447	1.142	30.868	91,875	65,230	1.408	120.927	**1,738,207**	**1,503,677**	**1.156**
2	Los Angeles	NS	69	2,757,913	2,479,594	1.112	29.400	187,455	174,090	1.077	75.051	**2,954,142**	**2,653,684**	**1.113**
3	Los Angeles	EW	42	1,233,089	1,251,723	0.985	32.720	81,210	80,719	1.006	79.769	**1,318,358**	**1,332,442**	**0.989**
4	Orange	NS	51	1,992,150	1,968,557	1.012	49.033	105,089	117,808	0.892	88.436	**2,100,100**	**2,086,365**	**1.007**
5	Los Angeles/ Orange	NS	31	1,592,584	1,303,352	1.222	36.493	99,192	80,031	1.239	115.247	**1,692,604**	**1,383,383**	**1.224**
6	San Bernardino/ Riverside	NS	48	1,310,620	1,134,768	1.155	41.941	120,293	100,851	1.193	116.516	**1,431,634**	**1,235,619**	**1.159**
7	San Bernardino	EW	28	907,580	859,811	1.056	37.711	48,686	110,899	0.439	91.306	**957,194**	**970,710**	**0.986**
8	Los Angeles	NS	26	1,221,830	1,173,315	1.041	20.077	100,738	88,082	1.144	80.645	**1,324,788**	**1,261,397**	**1.050**
9	San Bernardino/ Riverside	NS	32	497,705	505,972	0.984	33.996	32,337	52,180	0.620	103.841	**530,924**	**558,152**	**0.951**
10	Ventura/ Los Angeles	NS	11	436,046	433,715	1.005	20.553	37,852	27,905	1.356	143.725	**474,044**	**461,620**	**1.027**
11	Ventura	NS	9	267,843	203,148	1.318	37.501	28,295	23,937	1.182	160.184	**296,226**	**227,085**	**1.304**
12	Riverside	NS	8	167,197	169,701	0.985	33.817	20,154	32,627	0.618	45.010	**187,635**	**202,328**	**0.927**
13	San Bernardino	EW	8	190,147	132,663	1.433	62.510	26,186	28,318	0.925	16.848	**216,333**	**160,981**	**1.344**
14	Riverside	EW	10	299,214	246,044	1.216	28.953	21,861	28,782	0.760	53.863	**321,380**	**274,826**	**1.169**
15	Orange	NS	16	664,897	596,392	1.115	53.163	39,654	20,934	1.894	217.601	**704,970**	**617,326**	**1.142**
16	Los Angeles	EW	34	1,442,630	1,191,469	1.211	30.058	107,992	110,648	0.976	41.293	**1,554,546**	**1,302,117**	**1.194**
17	Los Angeles	NS	69	2,454,877	2,245,764	1.093	34.703	125,354	116,299	1.078	91.059	**2,588,035**	**2,362,063**	**1.096**
18	Los Angeles	EW	17	410,115	437,970	0.936	38.533	35,493	38,436	0.923	48.820	**446,216**	**476,406**	**0.937**
19	Los Angeles	EW	28	195,827	215,730	0.908	62.226	8,252	11,614	0.711	111.600	**204,453**	**227,344**	**0.899**
20	San Bernardino	EW	7	80,479	64,055	1.256	39.760	19,588	24,965	0.785	41.800	**100,082**	**89,020**	**1.124**
21	Riverside	EW	12	163,429	156,929	1.041	39.130	17,703	27,049	0.654	51.955	**181,319**	**183,978**	**0.986**
22	Riverside/ Imperial	EW	4	16,916	13,360	1.266	45.265	2,371	4,073	0.582	50.013	**19,288**	**17,433**	**1.106**
23	Imperial	EW	13	43,411	33,207	1.307	92.566	2,653	6,801	0.390	103.634	**46,105**	**40,008**	**1.152**
24	Los Angeles/ San Bernardino	EW	10	534,551	360,431	1.483	63.230	23,481	30,259	0.776	41.390	**558,119**	**390,690**	**1.429**
25	Ventura/ Los Angeles	NS	8	157,646	157,349	1.002	12.767	30,662	27,654	1.109	35.148	**188,418**	**185,003**	**1.018**

26	Los Angeles	NS	5	40,105	21,278	1.885	98.227	4,058	4,084	0.994	57.511	**44,163**	**25,362**	**1.741**
27	San Bernardino/ Riverside	NS	5	124,606	90,138	1.382	46.684	22,269	21,525	1.035	11.436	**146,875**	**111,663**	**1.315**
28	Riverside	EW	12	278,858	258,358	1.079	29.858	17,003	23,527	0.723	48.210	**295,990**	**281,885**	**1.050**
29	Los Angeles	NS	28	988,848	981,540	1.007	35.732	94,223	95,072	0.991	36.743	**1,083,906**	**1,076,612**	**1.007**
30	Riverside	EW	22	890,353	711,855	1.251	39.024	50,349	72,789	0.692	40.300	**941,046**	**784,644**	**1.199**
31	San Bernardino	NS	10	46,886	41,990	1.117	33.146	16,777	15,148	1.108	37.679	**63,664**	**57,138**	**1.114**
32	San Bernardino/ Riverside/ Imperial	NS	6	29,614	29,924	0.990	18.655	16,216	13,252	1.224	40.434	**45,853**	**43,176**	**1.062**
33	Imperial	EW	24	60,348	64,447	0.936	86.136	1,269	6,828	0.186	149.925	**61,672**	**71,275**	**0.865**
34	San Bernardino	NS	7	187,091	169,409	1.104	15.275	20,358	20,776	0.980	67.065	**207,587**	**190,185**	**1.092**
35	Los Angeles	NS	15	259,714	260,876	0.996	27.558	6,786	21,536	0.315	86.592	**267,481**	**282,412**	**0.947**
Total			**761**	**23,588,454**	**21,403,281**	**1.102**	**39.466**	**1,663,73**	**1,724,72**	**0.965**	**86.327**	**25,293,35**	**23,128,00**	**1.094**

Table 9-6: Year 2012 Screenline Comparison of Model Weekday ADT and Ground Counts by Volume Group

	Volume Group By Facility	OBS	Daily Vehicle Volumes				Daily Vehicle Volumes				Daily Vehicle Volumes		
			Light And Medium Duty Vehicles				Heavy-Duty Vehicles				Total		
			Model	Count	Ratio	RMSE	Model	Count	Ratio	RMSE	Model	Count	Ratio
1	0 - 4,999	165	649,131	355,779	1.82	220.94	18,509	35,908	0.52	121.92	669,227	391,687	1.71
2	5,000 - 24,999	347	5,838,727	4,880,627	1.20	58.53	214,858	332,581	0.65	85.30	6,074,760	5,213,208	1.17
3	25,000 - 49,999	126	4,408,278	4,005,656	1.10	37.07	232,551	339,376	0.69	58.47	4,656,540	4,345,032	1.07
4	50,000 - 99,999	68	5,471,221	5,326,238	1.03	19.81	544,995	531,663	1.03	48.18	6,017,848	5,857,901	1.03
5	100,000 - 199,999	54	7,031,635	6,654,035	1.06	19.93	636,192	478,906	1.33	55.01	7,668,887	7,132,941	1.08
6	200,000 or More	1	189,463	180,946	1.05	4.71	16,632	6,294	2.64	164.25	206,094	187,240	1.10
Total		**761**	**23,588,454**	**21,403,281**	**1.10**	**39.47**	**1,663,737**	**1,724,728**	**0.96**	**86.33**	**25,293,356**	**23,128,009**	**1.09**

Notes: RMSE - root mean square error, OBS - number of observed roadway facilities in the group.

Table 9-7: Year 2012 Screenline Comparison of Model Weekday ADT and Ground Counts by Facility Type

	Area Type	OBS	Light And Medium Duty Vehicles				Heavy-Duty Vehicles				Total		
			Model	Count	Ratio	RMSE	Model	Count	Ratio	RMSE	Model	Count	Ratio
10	Freeway	154	13,262,810	12,639,864	1.05	21.54	1,372,178	1,139,928	1.20	50.99	14,636,800	13,779,792	1.06
20	HOV	59	784,232	787,718	1.00	46.85	0	0	0.00	0.00	785,594	787,718	1.00
30	Expressway/Parkway	14	216,746	197,889	1.10	37.70	14,222	21,182	0.67	42.49	231,044	219,071	1.05
40	Principal Arterial	195	5,839,590	4,847,640	1.20	49.87	183,258	367,387	0.50	91.81	6,047,111	5,215,027	1.16
50	Minor Arterial	204	2,935,438	2,454,815	1.20	59.74	81,591	159,798	0.51	95.42	3,029,349	2,614,613	1.16
60	Major Collector	114	530,181	454,804	1.17	114.46	12,002	34,981	0.34	122.70	542,988	489,785	1.11
70	Minor Collector	21	19,456	20,551	0.95	146.88	487	1,452	0.34	142.03	20,470	22,003	0.93
Total		**761**	**23,588,454**	**21,403,281**	**1.10**	**39.47**	**1,663,737**	**1,724,728**	**0.96**	**86.33**	**25,293,356**	**23,128,009**	**1.09**

Notes: RMSE - root mean square error, OBS - number of observed roadway facilities in the group.

Table 9-8: Year 2012 Screenline Comparison of Model Weekday ADT and Ground Counts by Area Type

	Area Type	OBS	Light And Medium Duty Vehicles				Heavy-Duty Vehicles				TOTAL		
			Model	Count	Ratio	RMSE	Model	Count	Ratio	RMSE	Model	Count	Ratio
1	Core	-	-	-	-	-	-	-	-	-	-	-	-
2	Central Business District	5	140,412	101,786	1.38	62.96	3,589	3,630	0.99	30.85	144,529	105,416	1.37
3	Urban Business District	132	5,275,194	4,988,142	1.06	35.40	355,223	344,644	1.03	102.61	5,643,847	5,332,786	1.06
4	Urban	263	9,132,038	8,386,906	1.09	36.76	606,964	594,608	1.02	65.47	9,758,857	8,981,514	1.09
5	Suburban	227	7,123,999	6,353,633	1.12	37.84	447,082	515,996	0.87	97.45	7,577,711	6,869,629	1.10
6	Rural	119	1,646,327	1,393,316	1.18	60.60	222,643	234,572	0.95	76.44	1,869,691	1,627,888	1.15
7	Mountain	15	270,485	179,498	1.51	89.17	28,237	31,278	0.90	27.89	298,721	210,776	1.42
Total		**761**	**23,588,454**	**21,403,281**	**1.10**	**39.47**	**1,663,737**	**1,724,728**	**0.96**	**86.33**	**25,293,356**	**23,128,009**	**1.09**

Notes: RMSE - root mean square error, OBS - number of observed roadway facilities in the group.

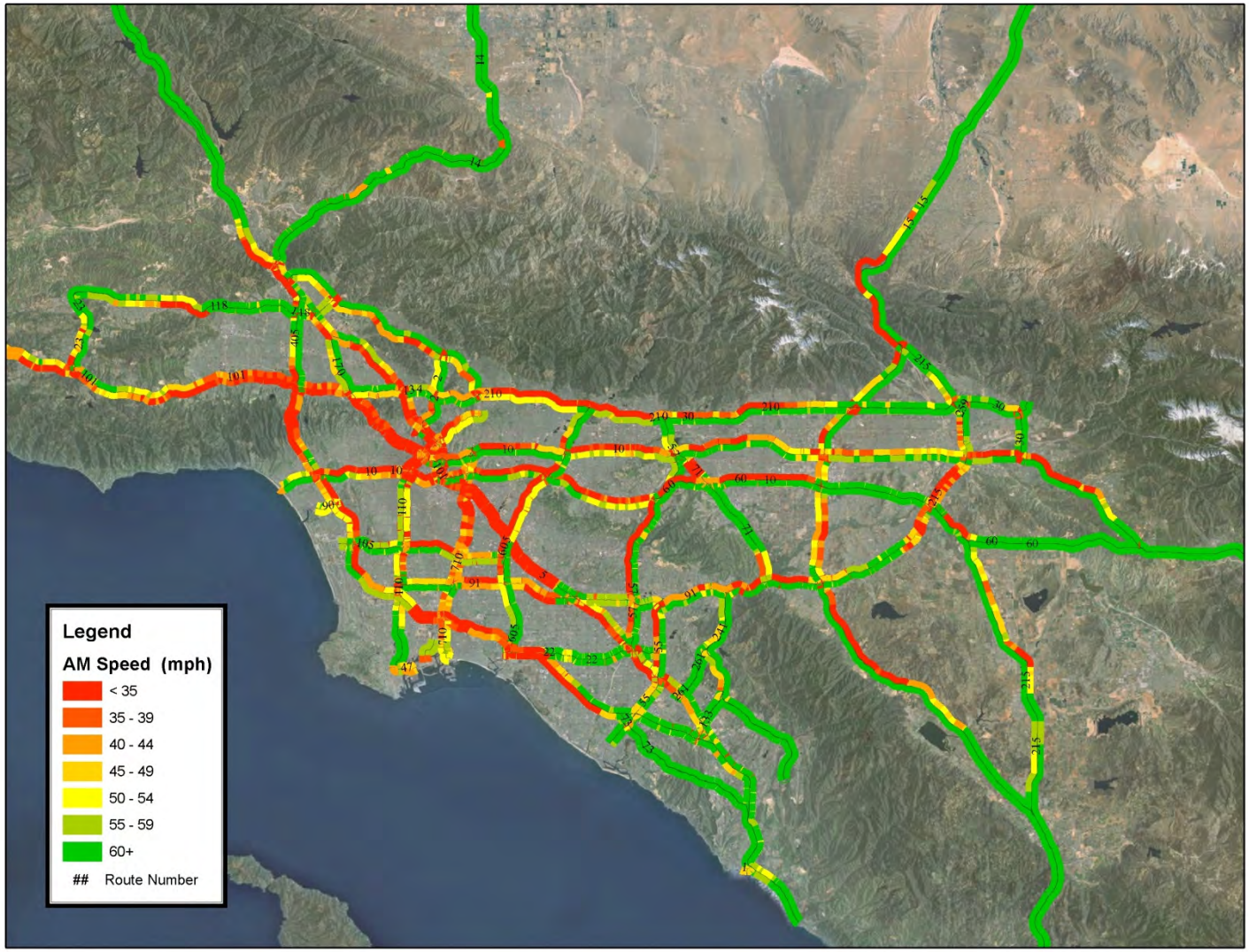


Figure 9-5: Year 2012 Model Estimated AM Peak Period Speeds

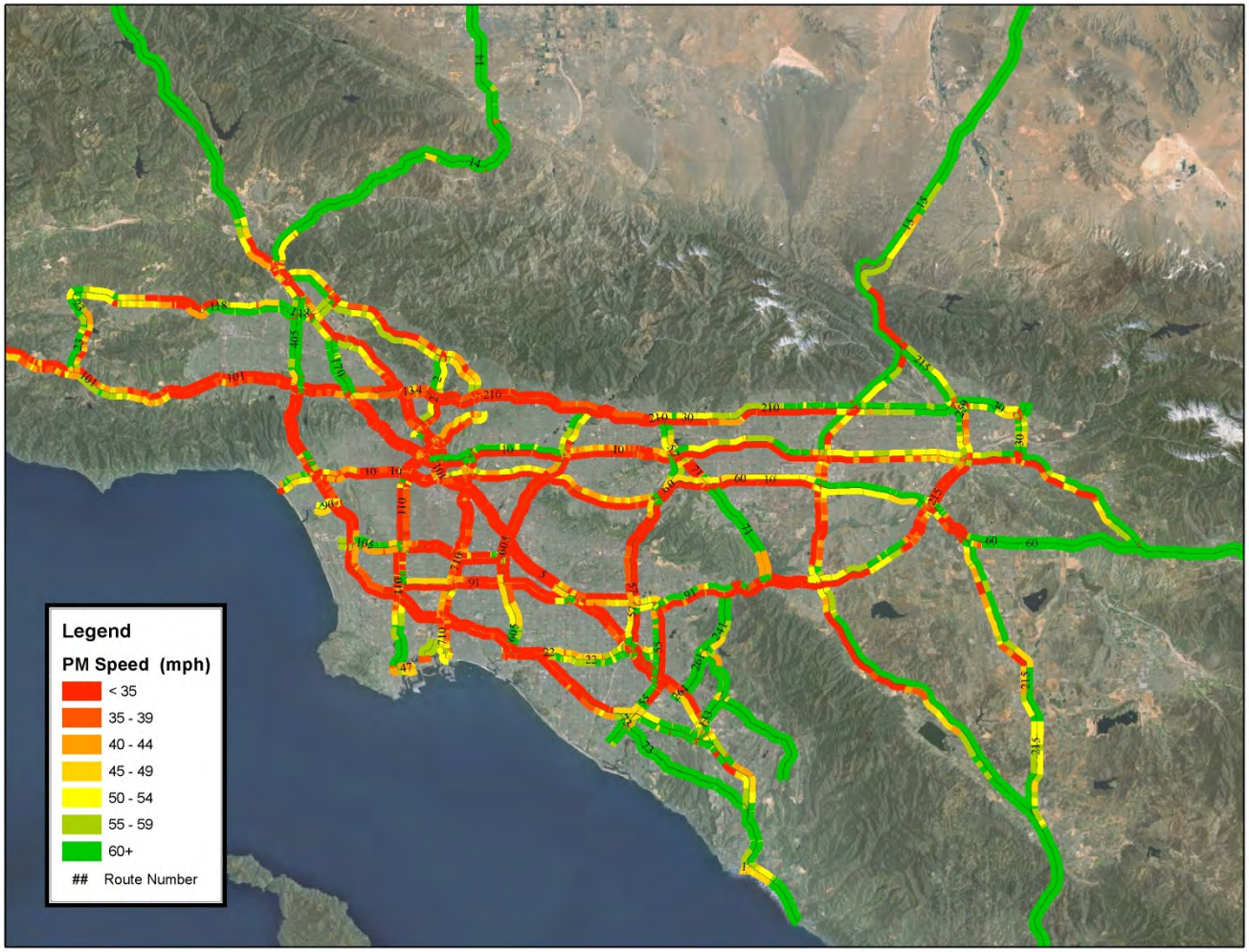


Figure 9-6: Year 2012 Model Estimated PM Peak Speeds

Figure 9-7: PeMS AM Peak Speeds

Figure 9-8: PeMS PM Peak Speeds

Transit Assignment Procedures

Transit assignment is the process of loading the transit trips onto the appropriate routes, to produce boardings on each route, by station, etc. Transit trips are assigned in production-attraction format, and for two time periods, peak and off-peak.

Transit trips estimated by the model choice model on the final feedback loop are aggregated across trip purposes to create linked transit trips for each primary line-haul mode, resulting in two transit trip tables: peak and off-peak linked trips. For drive access trips, only the portion from the park-n-ride location to the final attraction zone is included in the transit trip table. The rail trips are assigned in a manner consistent with the station choice estimates generated by the mode choice models. These trips are split into three parts:

- Production zone to boarding station (bus access trips only)
- Boarding station to alighting station (all trips)
- Alighting station to attraction zone (all trips)

The production zone to boarding station leg of walk access and drive access rail trips is not assigned to the transit network because it does not comprise any bus loadings.

The resulting peak and off-peak loaded transit network files are aggregated to create total daily loaded trips.

Transit Assignment Validation and Summary

The 2012 transit assignment loaded 2,612,100 unlinked passenger trips (boardings) on the transit network. Table 9-9 compares the model estimated daily transit boardings for the four predominant transit modes, to actual transit boarding statistics for 2012.

Table 9-9: Year 2012 Daily Transit Boardings - Model vs. Actual Counts

Transit Mode	Model Estimated Boardings	Actual Boardings	Ratio
Commuter Rail	46,914	44,472	**1.05**
Urban Rail	376,751	356,648	**1.06**
MTA Bus *	1,241,494	1,190,314	**1.04**
Other Transit **	946,598	763,648	**1.24**
Total Boarding	**2,611,757**	**2,355,082**	**1.11**

** MTA Bus: Local bus, Rapid bus, Express bus operated by LACMTA*
*** Other Transit: Local bus, Rapid bus, Express bus operated by other transit carriers in SCAG region*

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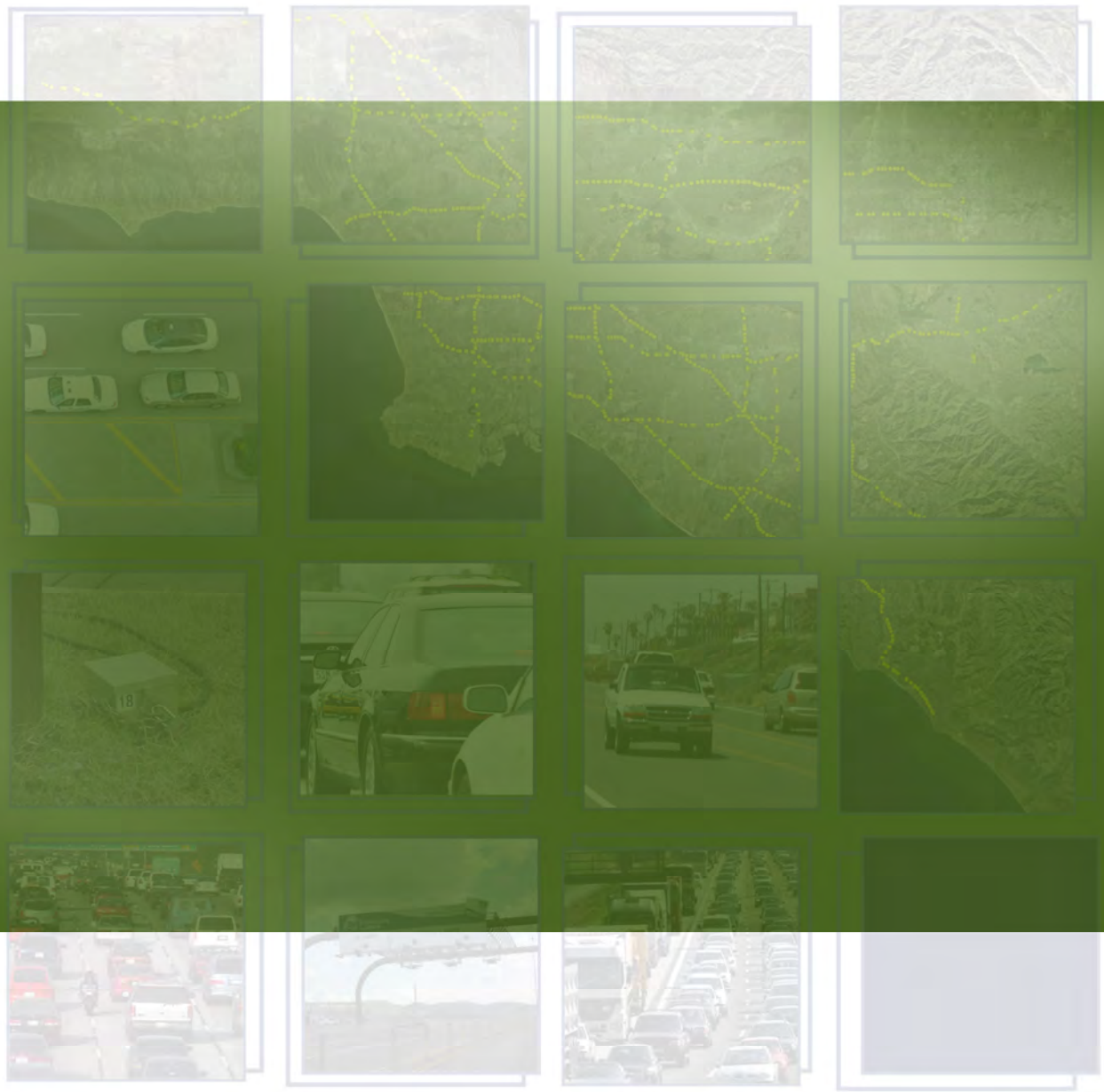
SOUTHERN CALIFORNIA ASSOCIATION of GOVERNMENTS

Appendix A: Highway Network Coding Conventions



Appendix A: Highway Network Coding Conventions

Facility Type

1 – Freeways

10 – Freeway

2 – HOV

20 – HOV 2
21 – HOV 3+
22 – HOV – HOV Connector

3 - Expressway/Parkway

30 – Undivided
31 – Divided, Interrupted
32 – Divided, Uninterrupted

4 - Principal Arterial

40 – Undivided
41 – Divided
42 – Continuous Left Turn

5 - Minor Arterial

50 – Undivided
51 – Divided
52 – Continuous Left Turn

6 – Major Collector

60 – Undivided
61 – Divided
62 – Continuous Left Turn

7 - Minor Collector

70 – Undivided
71 – Divided
72 – Continuous Left Turn
73 – Posted Speed 25
74 – Posted Speed 15

8 – Ramps

80 – Freeway to Freeway Connector
81 – Freeway to arterial
82 – Arterial to freeway
83 – Ramp Distributor
84 – Ramp from Arterial to HOV
85 – Ramp from HOV to Arterial
86 – Collector distributor
87 – Shared HOV Ramps to MF
89 – Truck only

9 – Trucks

90 – Truck only

100 – Centroid Connector - Tier 1

200 – Centroid Connector - Tier 2

Flag Fields

Main Lane – Through Freeway Lanes
Aux_Lane – Auxiliary Lane of Capacity Significance
Accel_Decel Lane - Other Freeway Lane

Truck Climbing Lanes Flag

0 – None
1 – 1 Truck Climbing Lane
2 – 2 Truck Climbing Lane
3 – 3 + Truck Climbing Lane

Toll Flag

11 – Toll road with fixed tolls
12 – Toll road with per-mile tolls
21 – Express/HOT lane with fixed tolls
22 – Express/HOT lane with per-mile tolls

Signals Flag

0 – None
1 – Signal and progression optimized streets
2 – Divided and signal optimized
3 – Continuous left-turn Lanes

HOV Operation Flag

0 – Standard HOV
1 – HOV AM Peak Only
2 – HOV PM Peak Only
3 – HOV AM & PM Peak Only

Truck Prohibition Flag

0 - Truck Not Prohibited
1 - Trucks Prohibited

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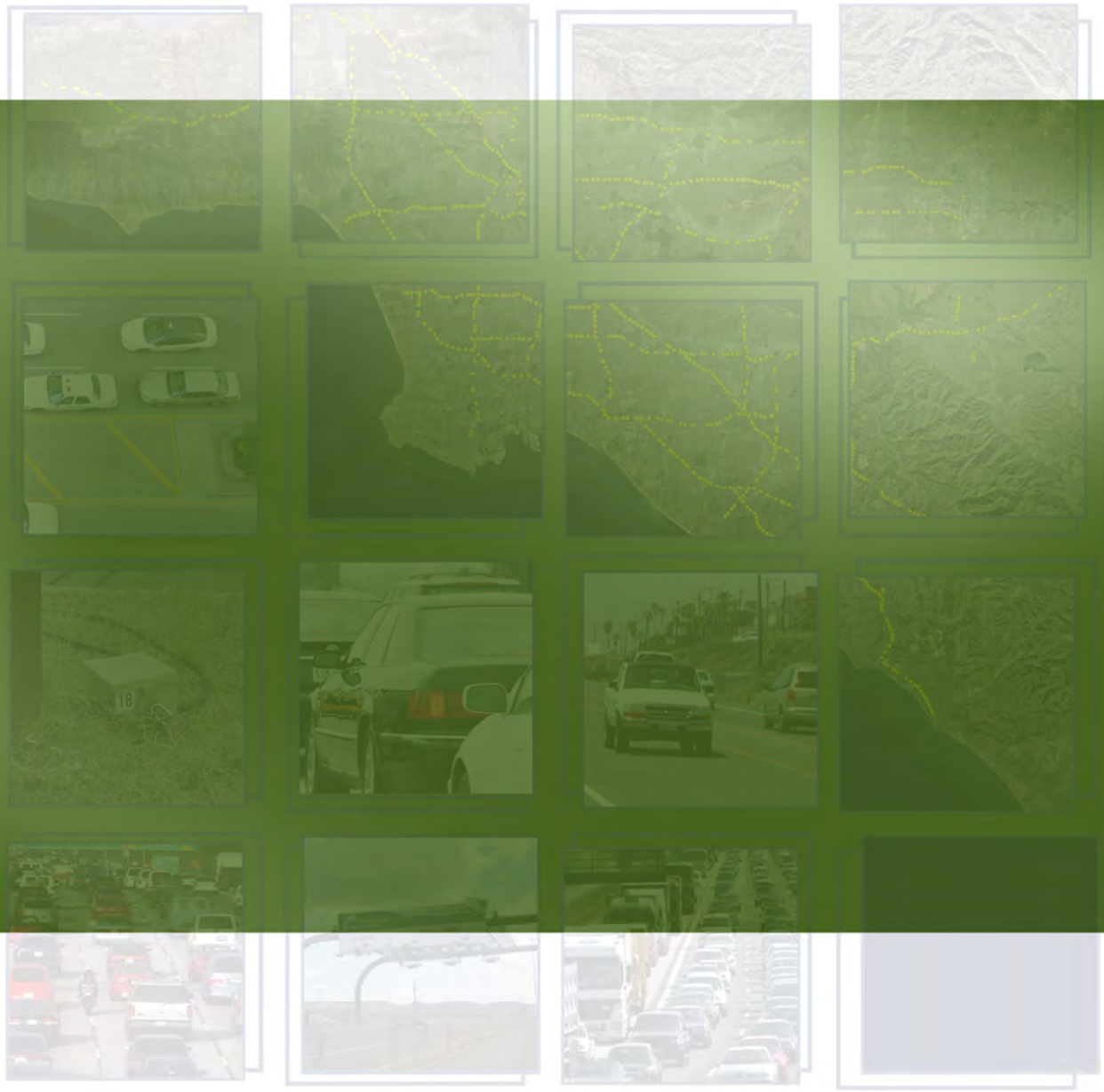
SOUTHERN CALIFORNIA ASSOCIATION of GOVERNMENTS

Appendix B: Auto Operating Costs



APPENDIX B: AUTO OPERATING COSTS

Auto operating cost (in cents/mile) is a key parameter in the calculation of the marginal utility cost functions used in mode choice. In the current mode split model, auto operating cost is defined as an out-of-pocket expense consisting of fuel (primarily gasoline) cost and "other" costs. Other costs include repairs, maintenance, tires, and accessories.

The table below summarizes the Year 2012 auto operation cost calculation and gives the values of the intermediate parameters. The calculation of the fuel cost per mile requires the composite fuel economy for the fleet and an average motor fuel price. Historical U.S. fuel efficiency data from 1980 to 2012 collected and compiled by the U.S. DOT National Highway Safety Administration was used by SCAG staff to calculate the average miles per gallon. The average price of a gallon of motor vehicle fuel was calculated as the sum of the prices of each grade sold, weighted by its fractional share of the market. The average fuel cost, including all taxes, for 2011 was 408.2 cents per gallon, which equates to 400.06cents per gallon in 2011 constant dollars. Thus the fuel costs for 2012 in terms of cents/mile can be derived from dividing fuel costs (400.06 cents/gallon) by average fuel efficiency (19.70 miles/gallon). As a result, the 20.31cents-per-mile fuel costs (in 2011 cents) was estimated and used for the 2012 model validation.

AUTO OPERATING COST CALCULATION

Description	Value	Based on
2012 On-road miles/gallon	19.70	MPG for SCAG Region (SCAG Model)
Avg. Year 2012 cents/gallon	408.20	Price & volume sold by fuel grade
Converted to 2011 cents*/gallon	400.06	
Fuel Cost (2011nts/mile)	20.31	Gallon/mile * cents/gallon
Other Costs (2011cents/mile)	6.47	Repairs, maint., tires, accessories
Total Cost/Mile (2011cents)	26.78	
Total Cost/Mile (2011 cents)	**26.78**	

Note: * CPI to 2011 = 1.02035

The Year 2012 Model Validation uses the value of 6.47 cents per mile (in 2011 dollars) for "other costs" as calculated by SCAG's Economic Analysis/Forecasting Section using data compiled by the General Services Administration and the National/Southern California AAA. Adding 6.47 cents per mile for "other" costs to the fuel costs per mile (20.31 cents/mile), yields a total auto operating cost of 26.78 cents per mile for 2012 in 2011 dollars.

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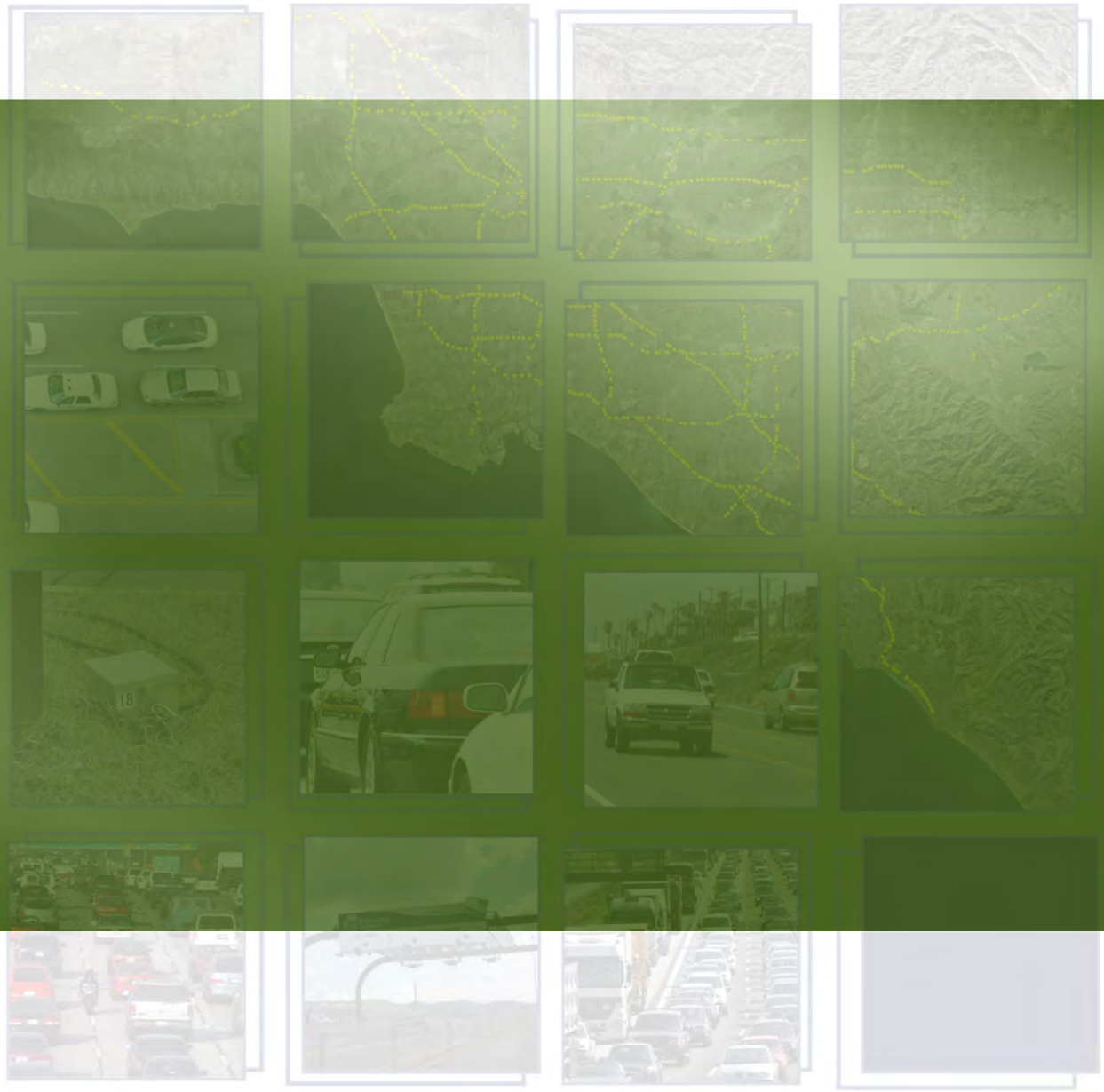
SOUTHERN CALIFORNIA ASSOCIATION of GOVERNMENTS

Appendix C: SCAG Model Peer Review #4



APPENDIX C: SCAG MODEL PEER REVIEW #4

Background

The primary objective of the Peer Review Panel was to review SCAG's model development program, validation tests and results, expert panel discussions, and overall model enhancement effort for validity with regard to state of the practice so that the Model can be applied with sufficient reliability in the RTP, FTIP, and AQMP planning processes. The Panel was also asked to provide recommendations for future short-term and long-term model enhancements. Their major conclusions and recommendations are described in this Appendix.

SCAG's 2008 Regional Travel Model Peer Review Panel was comprised of nationally-recognized experts in the fields of travel demand modeling and data collection and analysis. The panel members are listed below:

Peer Review Panel Members

Name	Organization
Guy Rousseau (Chair)	Atlanta Regional Commission
Chaushie Chu, Ph.D.	Los Angeles County Metropolitan Transportation Authority (Metro)
Chris Forinash	Environmental Protection Agency (EPA)
David Levinson, Ph.D.	University of Minnesota
David Ory, Ph.D.	Metropolitan Transportation Commission (MTC)
Eric Pihl	Federal Highway Administration (FHWA)
Kara M. Kockelman, P.E., Ph.D.	University of Texas, Austin; Expert Panel – Congestion Pricing
Ken Cervenka	Federal Transit Administration (FTA)
Mark Bradley	Mark Bradley Research and Consulting

Recommendations and Findings

Overall Findings of the Peer Review Panel

The current SCAG travel demand model is an advanced 4-step model that meets and in many cases exceeds the state of the practice – with the exception of the lack of zero-vehicle ownership sensitivity in the destination and mode choice models. With this one change properly addressed, the model is suitable for use in preparing 2016 RTP, conformity analysis, and SCS.

Model Strengths

The Panel feels that the level of effort for the SCAG model is impressive and ambitious. SCAG should continue to manage and coordinate the overall model enhancement program and individual consultant work efforts. The Panel encourages SCAG to continue to explore and implement as practical activity-based modeling and land use forecasting models.

There are a number of new features in the model that in all cases meet and in many instances are an improvement over the typical state of the practice, including:

- the multi-level geographic zone structure, particularly the "Tier 2" zone system with over 11,000 zones,
- a truck model that includes all classes of commercial vehicles, as well as a special generator model for the Ports of L.A and Long Beach (San Pedro Bay ports),
- grade-based PCE adjustments for heavy-duty trucks,
- the modeling of secondary truck trips associated with transload facilities,
- an auto ownership model that includes a number of different land use and accessibility variables,
- origin zone income model,
- the use of destination choice models with logsums from mode choice, instead of gravity models,
- the use of a time-of-day choice model, instead of fixed factors,
- the congestion pricing model's ability to analyze user benefits with regard to delay and mobility performance perspectives,
- the use of a nested mode choice model with a large number of competing modes, and
- the use of advanced models for congestion pricing.

Recommendations for Model Validation and 2012 RTP Process(Short-Term)

The major conclusions and recommendations of the Peer Review Panel for short-term consideration by SCAG are listed in this section. The recommendations described herein are intended for short-term implementation in the model prior to using the model for developing the 2012 RTP. In some cases, the recommendations do not require additional efforts on the part of the model development team.

- **Auto Ownership Sensitivity** – The Peer Review Panel suggests adding auto ownership sensitivity in the destination choice and mode choice models. Along with travel time and cost, auto availability is one of the most significant explanatory variables. For example, there may be zero-car households in higher income categories that are not captured by household income groups. Furthermore, there are single people and couples in high accessibility areas that choose to own less than one vehicle per driver. The California Transportation Commission's 2010 RTP Guidelines specifically mention auto availability per household as an important quantifiable variable for describing travel behavior. This could potentially be a significant issue in forecast years; and there may be significant cultural/immigrant differences that should be considered. In updating the model, the calibrated constant for zero-car household transit riders should be closely reviewed.

  Note: The 2001 onboard transit survey data does not include auto ownership information. The upcoming 2011 onboard survey being conducted by Metro will include this information.

  - *Response / Follow-Up – SCAG retained a consultant to address the Peer Review Panel's recommendation regarding auto ownership sensitivity. The final 2012 RTP Model is now stratified by car sufficiency and household income through the entire set of core demand models.*

- **Sensitivity Testing** – The Panel suggests doing sensitivity testing on a single-county version of the model, or something similar, since model run times limit opportunities for extensive testing. The sensitivities to longer travel by medium and high density areas should be reviewed.

  - *Response / Follow-Up – Model sensitivity tests were performed as part of the validation process. The Model displayed reasonable responses to changes made to the following variables:*
    1. *Fuel Pricing*
    2. *Auto Operating Costs*
    3. *Transit Capacity – Bus Frequency*
    4. *Transit Capacity – Rail Frequency*
    5. *Transit Capacity (bus, rail, BRT, etc. combined)*
    6. *Telecommute*
    7. *Freeway Capacity*
    8. *Income Distribution*

- **Traffic Count Averaging** – SCAG might consider averaging traffic counts over 3 or so years instead of using single year counts.

  - *Response / Follow-Up - The traffic counts on screenlines were closely reviewed against historical and current data on the specific link or adjoining links. This was done in an attempt to verify the quality of each screenline traffic count as well as to replicate 2008 conditions as closely as possible. If the desire is to replicate conditions before 2008 (i.e., before the economic*

downturn), this could be accomplished with geo-spatial (e.g., district, county, etc.) adjustment factors.

- **Heavy-Duty Truck Model Validation** – The Panel suggests comparing model results and observed data grouped by percent of trucks on roadway links to look at the model results in a different way.
    - *Response / Follow-Up - The Traffic Assignment Chapter provides tables showing heavy-duty trucks grouped and summarized by several different criteria.*

- **Validation of Speeds/Travel Times** - SCAG should try to match observed travel times (speeds) on links as part of validation.
    - *Response / Follow-Up - SCAG agrees with this comment and will attempt to implement this in future model validations. SCAG is currently investigating technology based methods for building an accurate region-wide speed database for this purpose.*

- **Reporting** - Add basic demographic profiles including maps of the SCAG region to the Validation Report.
    - *Response / Follow-Up – Maps displaying the geographic distribution of the basic demographic variables are included in this Report.*

Recommendations for Model Enhancement Program (Long-Term)

The major conclusions and recommendations of the Peer Review Panel for longer-term consideration by the SCAG and consultant modeling team are listed in this section. The recommendations described herein are intended for exploration or implementation in the model after the 2008 model validation is final. These longer-term recommendations would be anticipated prior to using the model for developing the 2016 RTP. In some cases, the recommendations do not require additional efforts on the part of the model development team.

- Model Inputs and Assumptions

    - Consider the use of actual speeds as free-flow speeds in the model rather than artificially capping them at the speed limit.

    - Review the potential for better enforcement of speeds through technology in the future and how this may impact assumptions in the model. Or, consider using the model to test the impacts of policy scenarios such as more comprehensive speed enforcement.

    - Incorporate the most recent Census data (e.g., SF-1) into the model assumptions, recognizing that it will not be available for the 2012 RTP analysis.

    - SCAG may wish to explore the use of the US Census LEHD (Longitudinal Employer - Household Dynamics) data for validation. There are some concerns that the LEHD data does not contain realistic home to work data.

      Note #1: Longitudinal Employer-Household Dynamics (LEHD) is an innovative program within the U.S. Census Bureau. Modern statistical and computing techniques are used to combine federal and state administrative data on employers and employees with core Census Bureau censuses and surveys while protecting the confidentiality of people and firms that provide the data (Source: US Census LEHD website).

      Note #2: The Atlanta Regional Commission has worked with LEHD data and is available for consultation.

    - Area types and densities may not be the best variables for determining roadway attributes (e.g., capacities, speeds, etc.). SCAG may wish to explore the use of roadway widths and intersections per mile surrogate variables to augment this approach.

    - The model should include attributes that allow for the specific quantification of benefits from ramp metering.

    - Toll-choice models in both mode choice and assignment may increase model run times unnecessarily. SCAG may wish to consider turning off one of these processes to reduce run times.

- Trip-Based Model Enhancements

  - Consider reversing the order of destination / mode choice nesting when the 2011 onboard transit survey data is available so that the mode choice logsum coefficient in the destination / mode choice model does not need to be constrained, or allow the inclusive value coefficient to be the estimated value even if it is greater than 1 (one).

  - Conduct rigorous performance checks of model results once the 2011 onboard transit survey data is available. These may include trip-based and activity-based district-to-district transit rider flows by mode, market segment, and mode of access, etc.

  - Run the model with observed travel times and review results.

  - The SCAG model uses a 5-option multi-nomial logit choice model used for auto ownership. Some have argued that this is an ordered choice. SCAG may wish to explore the use of negative binomial or ordered probit models for auto ownership.

  - The workplace allocation component of the destination choice model has room for improvement according to some panel members based on calibration/validation results. SCAG should review its methodology and ensure that the upcoming activity-based modeling will address these issues.

  - Consider the use of stochastic user equilibrium in traffic assignment to reduce the effects of all travelers taking the shortest path. This may however increase model run times.

  - The SCAG model currently runs the time-of-day choice model runs after mode choice. Some panel members suggested that SCAG consider reviewing the processing order.

  - SCAG should consider improving the integration between the time-of-day model and the congestion pricing model components.

- Model Integration and Software Implementation

  - SCAG should invest in the appropriate computer technology (e.g., servers with sufficient storage and processing power and/or multiple computers to run separate model components) to meet the demands of their ambitious modeling needs in the future.

  - Identify which modeling steps are scalable and where additional computers could reduce model run times through parallel processing.

- Congestion Pricing

  - Stated Preference survey results should be studied and validated to the extent possible before using them in the model for future applications such as the 2016 RTP.

  - The trip suppression model component appears ad hoc and should be better integrated with the model.

- Societal equity is often a political concern for any type of road pricing. A process (similar to the FTA SUMMIT program) to identify benefits/dis-benefits for users as well as non-users resultant from road pricing alternatives would be a helpful tool to address the equity concerns that may be raised by elected officials and interest groups.

- Heavy-Duty Truck Model
  - Review the assumption that the trucks per employee stay constant over time. Possibly use historical trends and commodity flow information to augment this part of the truck forecast assumptions.
  - Review and possibly update the assumptions for forecasting transload facilities.
  - Compare model results using the grade-adjusted PCE factors against model results without the PCE adjustment.

- Activity-Based Modeling
  - Model results should be compared at the 2035 future scenario level and fully understood before using ABM for the 2016 RTP.
  - SCAG should investigate how well the ABM results are matching journey to work data.
  - Next steps in developing the ABM modeling should be considered in the context of the weaknesses of the trip based model. For example, the workplace location choice, mode/destination choice order, capacity representation, etc. should be revisited.
  - The Activity Based Model should be used where possible to conduct sensitivity tests to the SB 375 / SCS policies that aren't well-represented in the trip-based model.

- Land Use Forecasting
  - Consider utilizing the PECAS / Land Use model to inform the heavy duty truck model. It is well-suited for this task.

Acronyms

Acronym	Definition
ABM	Activity-Based Modeling
ACS	American Community Survey
ADT	Average Daily Traffic
AOC	Auto Operating Cost
AQMP	Air Quality Management Plan
ARB	California's Air Resources Board
ASC	Alternative-Specific Constants
AT	Area Type
BPR	Bureau of Public Roads
BRT	Bus Rapid Transit
CBD	Central Business District
CEMDAP	Comprehensive Econometric Micro-simulator of Daily Activity-travel Patterns
CIP	Capital Improvement Program
CMAQ	Congestion Mitigation and Air Quality Improvement Program
CMP	Congestion Management Program
CPI	Consumer Price Index
CTPP	Census Transportation Planning Package
DOF	California Department of Finance
DOT	Department of Transportation
EDD	California Employment Development Department
EE	External-External
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FIRES	Finance/Insurance/Real Estate/Services
FT	Facility Type
FTA	Federal Transit Administration

Acronym	Definition
FTIP	Federal Transportation Improvement Program
GHG	Greenhouse Gas
GIS	Geographic Information System
GPS	Global Positioning System
GVW	Gross Vehicle Weight
HBCU	Home-Based College and University
HBNW	Home-Based Non-Work
HBO	Home-Based Other Trips
HBSC	Home-Based School
HBSH	Home-Based Shopping Trips
HBSP	Home-Based Serving-Passenger
HBSR	Home-Based Social-Recreational Trips
HBW	Home-Based Work
HBWD	Home-Based Work Direct
HBWS	Home-Based Work Strategic Trips
HCM	Highway Capacity Manual
HDT	Heavy Duty Truck
HH	Household
HHDT	Heavy-Heavy Duty Trucks
HIS	Household Interview Survey
HOT	High Occupancy Toll
HOV	High Occupancy Vehicle
HPMS	Highway Performance Monitoring System
ICTC	Imperial County Transportation Commission
HU	Housing Unit
IE/EI	Internal-External and External-Internal
IMX	Intermodal
ITMS	Intermodal Transportation Management System

Acronym	Definition
IVT	In-Vehicle Time
KNR	Kiss-and-Ride
KSF	Thousand Square Feet
LACMTA	Los Angeles County Metropolitan Transportation Authority
LADOT	Los Angeles Department of Transportation
LHDT	Light-Heavy Duty Trucks
LOS	Levels of Service
LS	Logsum
LTL	Less-Than-Truckload
LU	Land Use
MDAB	Mojave Desert Air Basin
MHDT	Medium-Heavy Duty Trucks
MPO	Metropolitan Planning Organization
MPU	Minimum Planning Unit
MTC	Metropolitan Transportation Commission
NAICS	North American Industrial Classification Standard
NHB	Non-Home Based
NHTS	National Household Travel Survey
NRE	Non-Retail Employment
NTD	National Transit Database
OBO	Other-Based Other Trips
OCTA	Orange County Transportation Authority
OD	Origin-Destination
PA	Production-Attraction
PCEs	Passenger Car Equivalents
PCPLPH	Passenger Car Per Lane Per Hour
PeMS	Performance Measurement System
PNR	Park-and-Ride

Acronym	Definition
PS	Posted Speed
PUMS	Public Use Microsample
QA/QC	Quality Assurance/Quality Control
RCTC	Riverside County Transportation Commission
RE	Retail Employment
RMSE	Root Mean Squared Error
RSA	Regional Statistical Area
RSE	Retail/Service Employment
RTP	Regional Transportation Plan
SACOG	Sacramento Area Council of Governments
SANBAG	San Bernardino Association of Governments
SASVAM	Small Area Secondary Variables Allocation Model
SB 375	California's Senate Bill 375
SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments
SCCAB	South Central Coast Air Basin
SCS	Sustainable Communities Strategy
SMT	Subregional Modeling Tool
SP	Stated Preference
SSAB	Salton Sea Air Basin
SSCAB	South Central Coast Air Basin
STCC	Standard Transportation Commodity Classification
TAZ	Transportation Analysis Zone
TCA	Transportation Corridor Agency
TDM	Transportation Demand Management
TIGER	Topographically Integrated Geographic Encoding and Referencing
TL	Truckload
TOD	Time-of-Day

Acronym	Definition
TRB	Transportation Research Board
TSM	Transportation System Management
VCTC	Ventura County Transportation Commission
VDF	Volume-Delay Function
VHT	Vehicle-Hours Traveled
VIUS	Vehicle Inventory and Use Survey
VMT	Vehicle Miles of Travel
VOT	Value of Time
VTRIS	Vehicle Travel Information System
WBO	Work-Based Other Trips
WIM	Weigh In Motion

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SCAG Management

- Hasan Ikhrata, Executive Director
- Darin Chidsey, Deputy Executive Director – Strategy, Policy and Public Affairs Group
- Debbie Dillon, Deputy Executive Director – Administration
- Joann Africa, Chief Counsel / Director of Legal Services
- Basil Panas, Chief Financial Officer
- Huasha Liu, Director of Land Use and Environmental Planning
- Rich Macias, Director of Transportation Planning (Retired)
- Naresh Amatya, Acting Director of Transportation Planning
- Catherine Chavez, Chief Information Officer

SCAG Transportation Modeling & Forecasting Staff

Transportation Modeling

- Guoxiong Huang, Manager of Modeling & Forecasting
- Hsi-Hwa Hu, Transportation Modeling Program Manager
- Mike Ainsworth, Transportation Modeling Program Manager
- Bayarmaa Aleksandr
- Rongsheng Luo
- Hao Cheng
- Kihong Kim
- Sreedhar Nambisan
- Mana Sangkapichai
- Arnie Sherwood
- Yongping Zhang
- Yang Wang
- Qianyao Duan
- Yuting Hou

Forecasting Staff

- Ying Zhou, Program Manager II
- JungA Uhm
- Sungbin Cho
- Sungho Ryu
- Cheol-Ho Lee
- Sung Su Yoon

SCAG Research & Analysis

- Frank Wen, Manager of Research & Analysis
- Simon Choi, Chief of Research and Forecasting
- Javier Aguilar
- Kimberly Clark
- Seong Hee Min

- Javier Minjares (Retired)
- Jung H. Seo
- Ping Wang
- Joongkoo Cho
- Tom M. Vo

SCAG's Modeling Task Force and Participating Agencies

- California State Department of Transportation – Caltrans Districts 7, 8, 11, & 12
- SCAG Subregional Agencies
- California Air Resources Board
- South Coast Air Quality Management District
- Ventura Air Pollution Control District
- Mojave Desert Air Quality Management District
- Imperial County Air Pollution Control District
- Antelope Valley Air Pollution Control District
- Los Angeles County Metropolitan Transportation Authority
- Orange County Transportation Commission
- Riverside County Transportation Commission
- Riverside County
- San Bernardino Associated Governments
- Ventura County Transportation Commission
- Imperial County Transportation Commission
- Federal Highway Administration
- Federal Transit Administration
- Environmental Protection Agency

Consultant Team

- AECOM Technical Services Inc. – Transit Level of Service
- Caliper Corporation – TransCad Software Services and Model Development Support
- Cambridge Systematics – Heavy-Duty Truck Model Development and Model Calibration
- Dowling Associates – Speed Data Gathering and Speed Curve Development
- Jacobs Engineering – Regional Highway Inventory
- LSA Associates, Inc. – Traffic Count Development and Model Validation Support
- ME Consulting – Software and Data Support
- Parsons Brinckerhoff – Model Enhancement, Model Calibration and Model Validation
- Sierra Research Inc. – Air Quality Modeling Enhancement and Support

Report Development and Editing

- Bayarmaa Aleksandr - SCAG
- Eric Bierce – Cambridge Systematics
- Sean McAtee – Cambridge Systematics
- Rosella Picado – Parsons Brinckerhoff

APPENDIX B – SCAG SUB-REGIONAL MODEL DEVELOPMENT TOOL (SMDT)

DRAFT

SCAG Sub-regional Model Development Tool (SMDT)

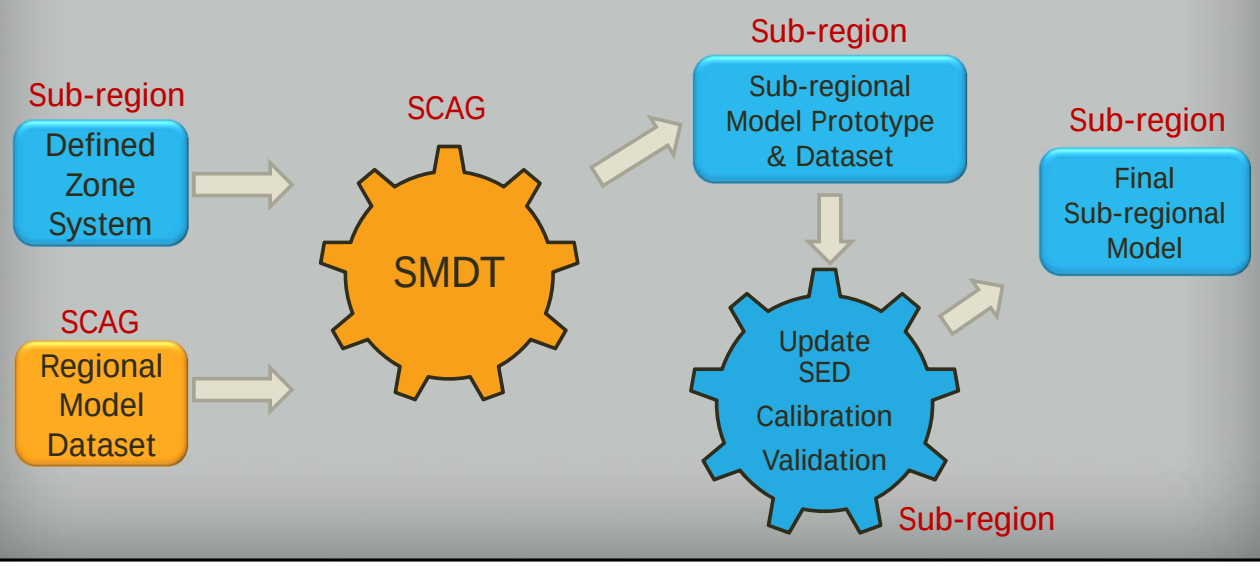
Sep 28, 2016

Hao Cheng (SCAG)
Jim Lam (Caliper)

Purpose

- To save time and cost on sub-regional model development
- To promote collaboration and model consistency in SCAG Region
- To enhance modeling support among SCAG and member agencies

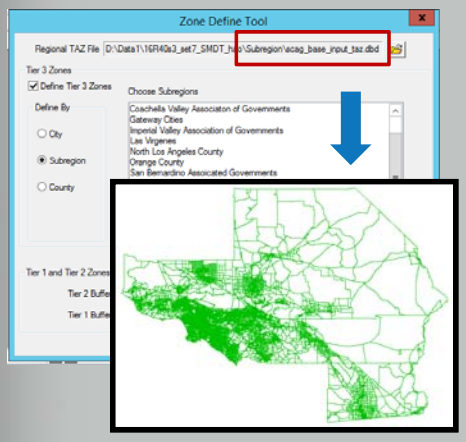
Subregional Model Development Work Flow w/SMDT



Four Components of SMDT

- Zone Define Tool
- Data Conversion Tool
- SED Estimation Tool
- Sub-regional Model Prototype
  - Model Executable add-in in TransCAD

Zone Define Tool



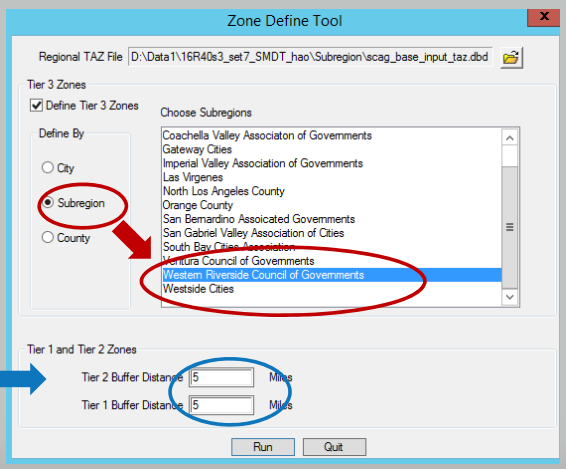
Input for Zone Define Tool
: A base input TAZ geography file

- 14564 base zone units. A combination of SCAG tier2 and tier3 TAZs
- Base unit can be further split within a tier2 zone

Zone Define Tool

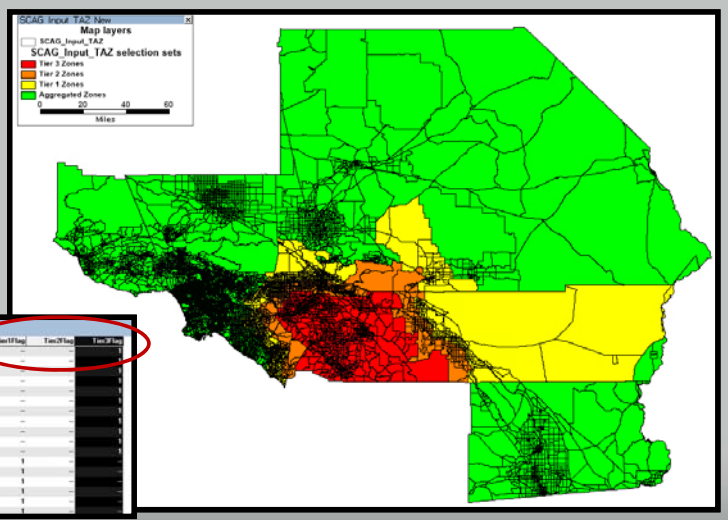
Pick a predefined area

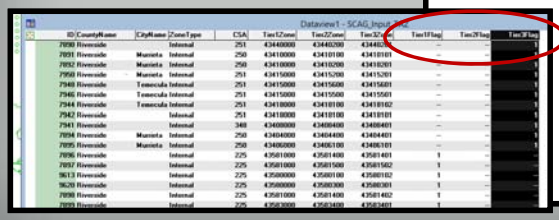
Set Buffer Distance



Zone Define Tool

Basic Input zones are flagged with aggregation information for the data conversion tool





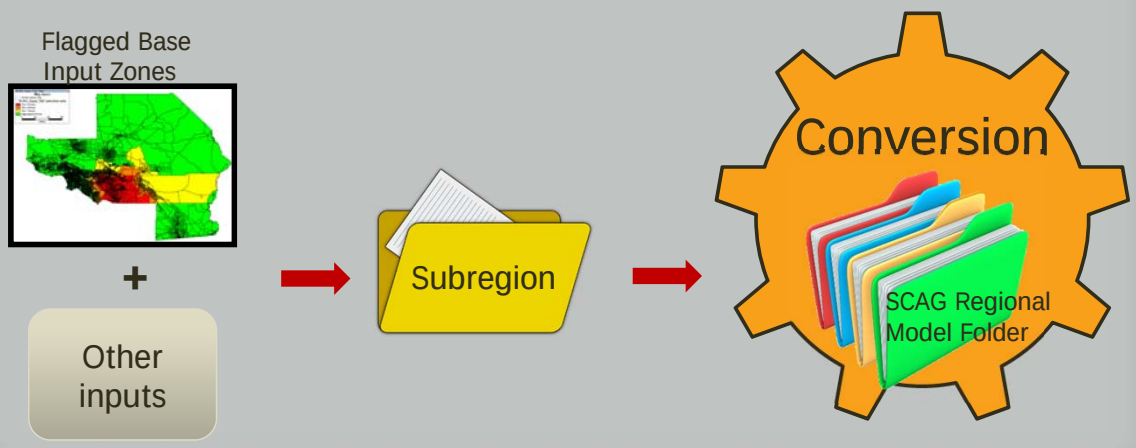
Zone Define Tool

The three flag attributes can be further adjusted manually

Dataview1 - SCAG_Input_TAZ

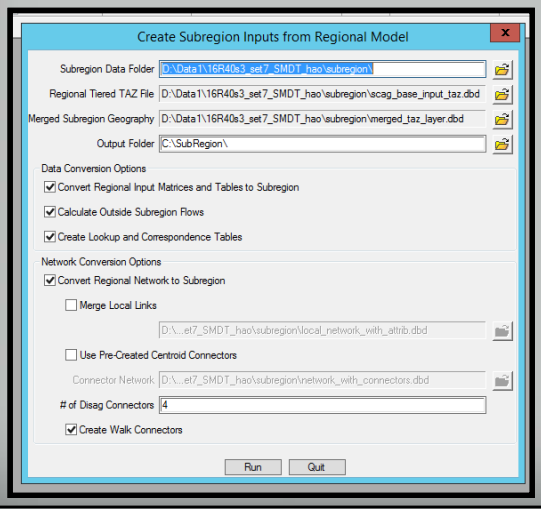
ID	CountyName	CityName	ZoneType	CSA	Tier1Zone	Tier2Zone	Tier3Zone	Tier1Flag	Tier2Flag	Tier3Flag
7890	Riverside		Internal	251	43440000	43440200	43440201	--	--	1
7891	Riverside	Murrieta	Internal	250	43410000	[illegible]	43410101	--	--	1
[illegible]	[illegible]	[illegible]	[illegible]	250	[illegible]	43410200	43410201	--	--	1
[illegible]	[illegible]	[illegible]	[illegible]	251	[illegible]	43415200	43415201	--	--	1
[illegible]	[illegible]	[illegible]	[illegible]	251	43415000	43415600	43415601	--	--	1
[illegible]	[illegible]	[illegible]	[illegible]	251	43415000	43415500	43415501	--	--	1
[illegible]	[illegible]	[illegible]	[illegible]	251	43418000	43418100	43418102	--	--	1
[illegible]	[illegible]	[illegible]	[illegible]	251	43418000	43418100	43418101	--	--	1
[illegible]	[illegible]	[illegible]	[illegible]	348	43408000	43408400	43408401	--	--	1
[illegible]	[illegible]	[illegible]	[illegible]	250	43404000	43404400	43404401	--	--	1
[illegible]	[illegible]	[illegible]	[illegible]	250	43406000	43406100	43406101	--	--	1
[illegible]	[illegible]	[illegible]	[illegible]	225	43581000	43581400	43581401	1	--	--
7897	Riverside		Internal	225	43581000	43581500	43581502	1	--	--
9613	Riverside		Internal	225	43580000	43580100	43580102	1	--	--
9620	Riverside		Internal	225	43580000	43580300	43580301	1	--	--
7898	Riverside		Internal	225	43581000	43581400	43581402	1	--	--
7899	Riverside		Internal	225	43583000	43583400	43583401	1	--	--

Data Conversion Tool



Data Conversion Tool

Interface

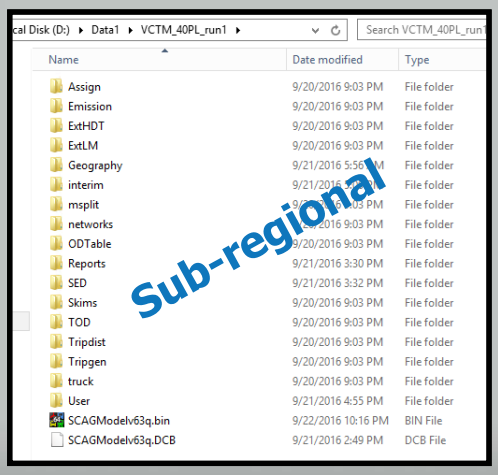


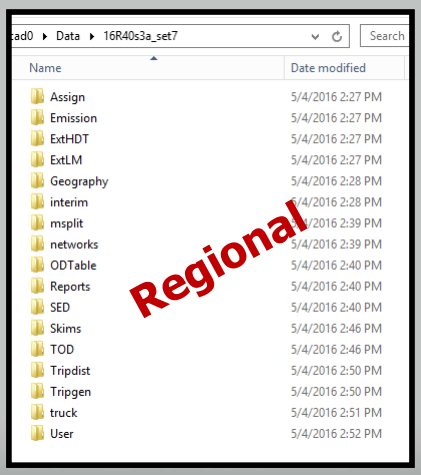
Converted data saved in a new folder

Options to import local street links and pre-defined centroid connectors into regional network

Data Conversion Tool

The Output of Data Conversion is a dataset with similar structure as SCAG TBM

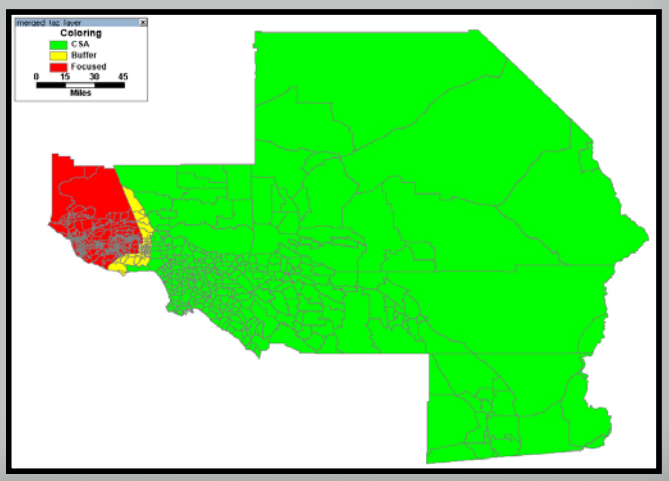




Data Conversion Tool

Keynotes on output

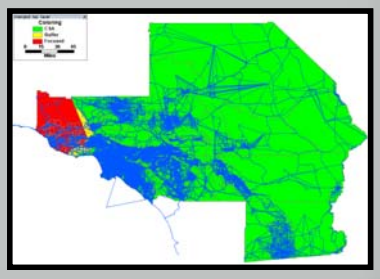
- Zones are aggregated based on the flags
- Focused area, buffer area, and aggregated area
- Sample for a focus on Ventura County



Data Conversion Tool

Keynotes on output

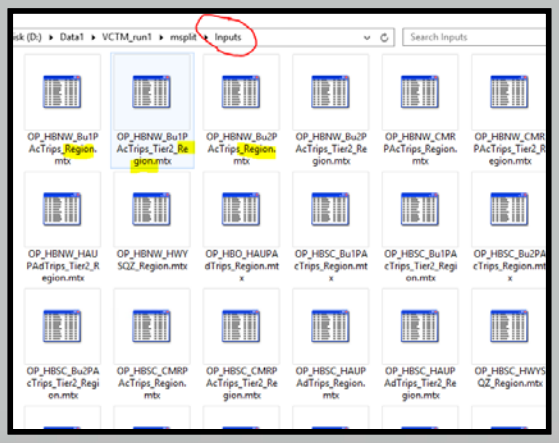
- Network has the same **resolution** as the SCAG regional model by default.
- Only extra centroid **connectors** added
- If the **local street** and/or pre-created centroid connectors options are activated they will be integrated into the sub regional network
- The converted sub regional network can be **further edited** in TransCAD manually



Data Conversion Tool

Keynotes on output

- Trips in **outside area** are preserved at aggregated zone (CSA) level during conversion
- Person trips and vehicle trips
- To maintain the consistency with SCAG regional model



Data Conversion Tool

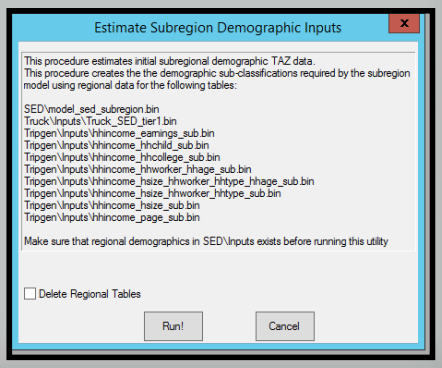
Keynotes on output

- SED is not generated for the **focused** area in data conversion.
- There is a separate tool for SED: SED Estimation Tool

SED Estimation Tool

Purposes

- To generate a set of **sandbox** SED for model development and test at an early stage
- To create a draft version of SED as the starting point for SED development



SED Estimation Tool

- The output can be enhanced by updating the split percentage fields in the TAZ attributes.
- They are used by SED Estimation Tool to split data from an upper level to a lower level
- By default the two fields are calculated by geographic area

Dataview1 - merged_taz_layer_Tier2

ID	SubregionTAZ	ZoneType	SplitPercentT1	SplitPercentT2	Tier1Zone	Tier2Zone
486	60107101	Internal	0.538	1.000	60107000	60107100
487	60107201	Internal	0.462	1.000	60107000	60107200
488	60108101	Internal	1.000	1.000	60108000	60108100
489	60109101	Internal	0.464	1.000	60109000	60109100
490	60109201	Internal	0.370	1.000	60109000	60109200
491	60109301	Internal	0.165	1.000	60109000	60109300
492	60110101	Internal	1.000	1.000	60110000	60110100
493	60111101	Internal	0.518	1.000	60111000	60111100
494	60111201	Internal	0.482	1.000	60111000	60111200
495	60112101	Internal	0.524	1.000	60112000	60112100
496	60112201	Internal	0.476	1.000	60112000	60112200
497	60113101	Internal	0.393	1.000	60113000	60113100
498	60113201	Internal	0.140	1.000	60113000	60113200
499	60113301	Internal	0.144	1.000	60113000	60113300
500	60113401	Internal	0.060	1.000	60113000	60113400
501	60113501	Internal	0.263	1.000	60113000	60113500
502	60114101	Internal	0.460	1.000	60114000	60114100
503	60114201	Internal	0.540	1.000	60114000	60114200
504	60115101	Internal	0.500	1.000	60115000	60115100

SED Estimation Tool

- SED for sub-regional model is in a similar structure as SCAG regional model except it only has one tier of zones.
- Include:
  - One master SED table in \SED\
  - Eight joined distribution tables in \Tripgen\Inputs\
  - One truck SED table in \Truck\Inputs\

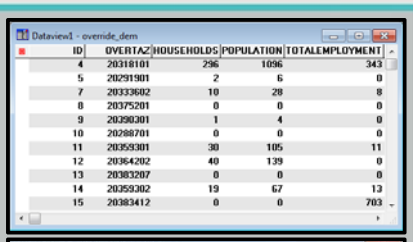
SED Estimation Tool

- Tier2 TAZ is the minimum geographic unit in SCAG regional model. Converting SED from regional model to a finer resolution will cause inevitable bias.
- Ideally the SED for focused area should be prepared by the user of the sub-regional model
- There is a utility included in Sub-regional Model Prototype to assist SED update.

Sub-regional Model Prototype

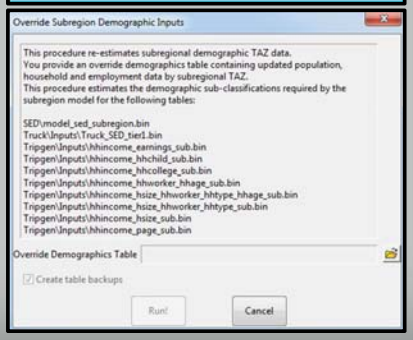
Sub-regional Model Prototype

- User provides custom demographics for the subregion TAZs
- Only a small subset of the SCAG demographic variables are required
- Override utility will estimate all related demographic fields



Dataview1 - override_dem

ID	OVERTAZ	HOUSEHOLDS	POPULATION	TOTALEMPLOYMENT
4	20318101	296	1096	343
5	20291901	2	6	0
7	20333602	10	28	8
8	20375201	0	0	0
9	20390301	1	4	0
10	20288701	0	0	0
11	20359301	30	105	11
12	20364202	40	139	0
13	20383207	0	0	0
14	20359302	19	67	13
15	20383412	0	0	703



Override Subregion Demographic Inputs

This procedure re-estimates subregional demographic TAZ data.
You provide an override demographics table containing updated population, household and employment data by subregional TAZ.
This procedure estimates the demographic sub-classifications required by the subregion model for the following tables:

SED\model_sed_subregion.bin
Truck\Inputs\.Truck_SED_tier1.bin
Tripgen\Inputs\.hhincome_earnings_sub.bin
Tripgen\Inputs\.hhincome_hhchild_sub.bin
Tripgen\Inputs\.hhincome_hhcollege_sub.bin
Tripgen\Inputs\.hhincome_hhworker_hhage_sub.bin
Tripgen\Inputs\.hhincome_hsize_hhworker_hhtype_hhage_sub.bin
Tripgen\Inputs\.hhincome_hsize_hhworker_hhtype_sub.bin
Tripgen\Inputs\.hhincome_hsize_sub.bin
Tripgen\Inputs\.hhincome_page_sub.bin

Override Demographics Table

Create table backups

Run! Cancel

Sub-regional Model Prototype

- Sub-regional Model Prototype is a fully functional model
- Built on TransCAD platform as an add-in
- User Interface is similar as SCAG regional model UI

Sub-regional Model Prototype

- Sub-regional Model Prototype inherits coefficients from SCAG regional model
- Need further calibration and validation for the focused area

Sub-regional Model Prototype

Sub-regional Model Prototype consists of the following stages:

- Initialization
- Network Skimming
- Trip Generation
- Trip Distribution
- Modal Split
- Time of Day Models
- Trip Assignment

Sub-regional Model Prototype

- Initialization
- Network Skimming
- Trip Generation
- Trip Distribution
- Modal Split
- Time of Day Models
- Trip Assignment

Initialization

- Calculate Override Demographics
- Make Working Copies of Networks
- Calculate Link Speeds and Costs
- Calculate Link Capacities
- Build Highway Network
- Compute Network Supply Statistics
- Choose Representative Zones

Sub-regional Model Prototype

- Initialization
- Network Skimming
- Trip Generation
- Trip Distribution
- Modal Split
- Time of Day Models
- Trip Assignment

Network Skimming

- Calculate Highway Skim Matrices
- Calculate Transit Costs
- Add Transit Walk Accessibility Links
- Build and Skim Transit Matrices

Sub-regional Model Prototype

- Initialization
- Network Skimming
- Trip Generation
- Trip Distribution
- Modal Split
- Time of Day Models
- Trip Assignment

Sub-regional Model Prototype

- Initialization
- Network Skimming
- Trip Generation
- Trip Distribution
- Modal Split
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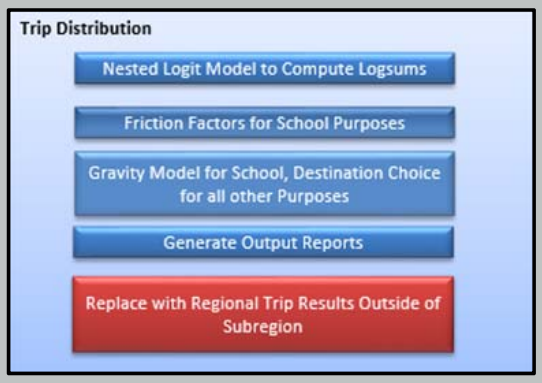


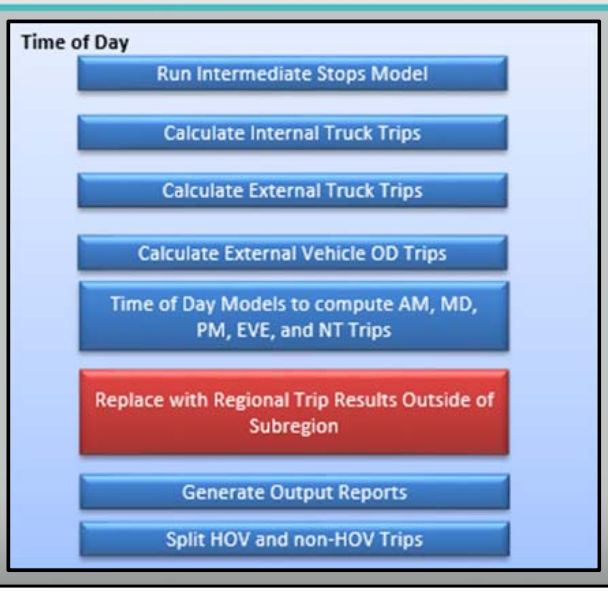
HC1

Sub-regional Model Prototype

- Initialization
- Network Skimming
- Trip Generation
- Trip Distribution
- Modal Split
- Time of Day Models
- Trip Assignment

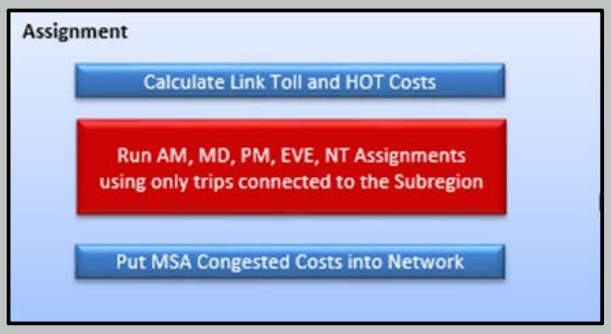
Sub-regional Model Prototype

- Initialization
- Network Skimming
- Trip Generation
- Trip Distribution
- Modal Split
- Time of Day Models
- Trip Assignment



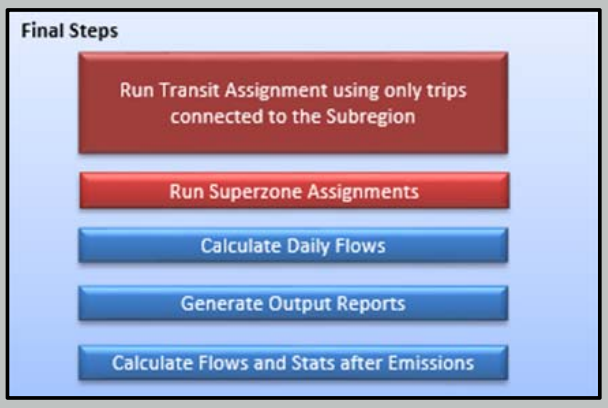
Sub-regional Model Prototype

- Initialization
- Network Skimming
- Trip Generation
- Trip Distribution
- Modal Split
- Time of Day Models
- Trip Assignment



Sub-regional Model Prototype

- Initialization
- Network Skimming
- Trip Generation
- Trip Distribution
- Modal Split
- Time of Day Models
- Trip Assignment



Sub-regional Model Prototype

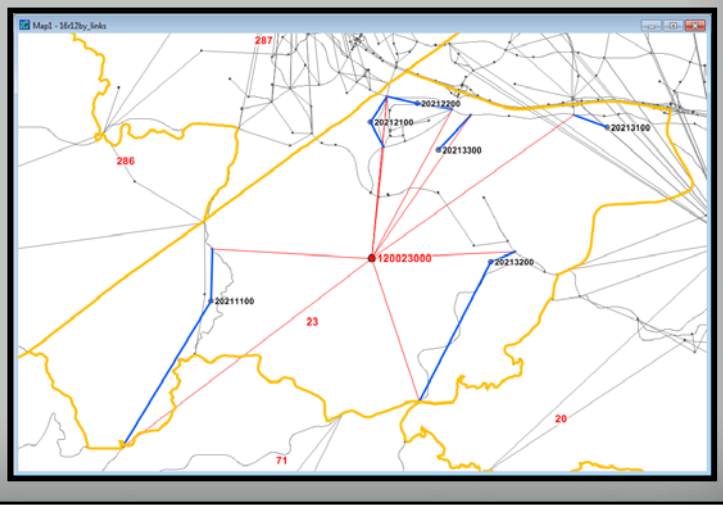
Traffic/Transit Assignment in Sub-regional Model Prototype

- The assignment model is a focused assignment which only assigns trips that start or end in the focused area.
- Region-wide level traffic and transit volumes that are unconnected to the focused area are used as preload volumes to the assignments.
- The Assignments extract only the trips that start or end in the focused area and assign these trips

Sub-regional Model Prototype

Superzone Assignments

- Outside the subregion, trips are accessed through superzones which are fairly long centroid connectors
- Superzone assignment re-positions these trips to go through local connectors to better estimate local flows
- Only trips from the superzone to a subregion zone are affected



Sub-regional Model Prototype

Sub-regional Model Prototype **Performance**

- The SMP can generate consistent output with SCAG regional model at county level
- In a variety of output:
  - Person trip
  - Mode share
  - Vehicle trip
  - VMT

Sub-regional Model Prototype

Person trip summary

* Ventura County is the focused area

Reg Mod						
cnty	Prod_PK	Prod_OP	Prod Day	Attr_PK	Attr_OP	Attr_Day
1	254,540	238,682	493,222	255,001	238,713	493,714
2	16,948,770	17,751,347	34,700,117	17,078,497	17,830,529	34,909,027
3	5,435,961	5,728,637	11,164,598	5,642,022	5,838,822	11,480,844
4	3,607,453	3,649,349	7,256,802	3,411,137	3,542,021	6,953,158
5	3,401,462	3,454,428	6,855,890	3,299,208	3,393,556	6,692,764
6	1,435,662	1,478,349	2,914,012	1,407,943	1,459,185	2,867,128
			63,384,641			63,396,634
Sub Mod						
cnty	Prod_PK	Prod_OP	Prod Day	Attr_PK	Attr_OP	Attr_Day
1	253,591	236,509	490,100	252,200	236,237	488,437
2	16,958,379	17,772,352	34,730,731	17,087,030	17,852,960	34,939,990
3	5,434,469	5,727,170	11,161,639	5,643,968	5,841,034	11,485,001
4	3,603,768	3,646,391	7,250,159	3,410,344	3,541,091	6,951,435
5	3,400,330	3,451,251	6,851,582	3,299,279	3,391,014	6,690,293
6	1,435,895	1,478,641	2,914,536	1,408,196	1,459,540	2,867,736
			63,398,746			63,422,891
%						
cnty	Prod_PK	Prod_OP	Prod Day	Attr_PK	Attr_OP	Attr_Day
1	1.00	0.99	0.99	0.99	0.99	0.99
2	1.00	1.00	1.00	1.00	1.00	1.00
3	1.00	1.00	1.00	1.00	1.00	1.00
4	1.00	1.00	1.00	1.00	1.00	1.00
5	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00
			1.00			1.00

Sub-regional Model Prototype

Mode Share Summary

* Ventura County is the focused area

Reg Mod	DA	SR2	SR3	Passenger	Transit	NM
Imperial	0.44	0.08	0.06	0.23	0.00	0.18
Los Angeles	0.40	0.07	0.08	0.28	0.03	0.13
Orange	0.44	0.08	0.08	0.28	0.01	0.11
Riverside	0.46	0.08	0.08	0.27	0.00	0.11
San Bernardino	0.45	0.08	0.08	0.27	0.00	0.11
Ventura	0.486	0.077	0.069	0.250	0.005	0.113
SCAG	0.42	0.08	0.08	0.28	0.02	0.12

sub Mod	DA	SR2	SR3	Passenger	Transit	NM
Imperial	0.44	0.08	0.06	0.23	0.00	0.18
Los Angeles	0.40	0.08	0.08	0.28	0.03	0.13
Orange	0.44	0.08	0.08	0.28	0.01	0.11
Riverside	0.46	0.08	0.08	0.27	0.00	0.11
San Bernardino	0.45	0.08	0.08	0.27	0.00	0.11
Ventura	0.487	0.077	0.068	0.250	0.005	0.112
SCAG	0.42	0.08	0.08	0.28	0.02	0.12

delta share	DA	SR2	SR3	Passenger	Transit	NM
Imperial	0.000	0.000	0.000	0.000	0.000	0.000
Los Angeles	0.002	0.001	0.000	0.000	-0.001	-0.001
Orange	0.000	0.000	0.000	0.000	0.000	0.000
Riverside	0.000	0.000	0.000	0.000	0.000	0.000
San Bernardino	0.000	0.000	0.000	0.000	0.000	0.000
Ventura	0.0016	0.0003	-0.0003	-0.0004	-0.0006	-0.0006
SCAG	0.001	0.000	0.000	0.000	0.000	-0.001

Sub-regional Model Prototype

Vehicle Trip Summary

* Ventura County is the focused area

Reg Mod

LM	1	2	3	4	5	6	TOT
1	353,342	635	232	7,532	581	64	362,387
2	581	18,736,164	943,999	122,903	378,000	224,013	20,405,662
3	340	946,999	5,995,563	132,857	100,653	6,908	7,183,319
4	7,391	123,432	127,686	3,921,041	387,765	2,998	4,570,313
5	497	375,314	97,345	387,283	3,455,583	4,731	4,320,753
6	27	225,478	6,567	2,603	5,093	1,662,404	1,902,172
TOT	362,179	20,408,022	7,171,392	4,574,219	4,327,675	1,901,119	38,744,606

HDT	1	2	3	4	5	6	TOT
1	13,142	362	98	316	351	104	14,373
2	333	533,565	45,529	18,560	27,975	11,867	637,830
3	98	45,385	124,029	7,383	7,382	4,583	188,860
4	316	18,702	7,382	61,991	14,353	1,184	103,927
5	351	28,260	7,384	14,357	78,218	1,413	129,983
6	104	11,942	4,583	1,185	1,412	33,681	52,907
TOT	14,344	638,217	189,004	103,792	129,691	52,832	1,127,881

Sub Mod

LM	1	2	3	4	5	6	TOT
1	353,342	638	232	7,532	581	61	362,387
2	585	18,969,210	949,799	123,082	378,434	236,132	20,657,242
3	340	954,960	5,995,563	132,857	100,653	7,083	7,191,455
4	7,391	123,818	127,686	3,921,041	387,765	2,873	4,570,573
5	497	376,308	97,345	387,283	3,455,583	4,537	4,321,553
6	24	237,583	6,415	2,457	4,851	1,675,139	1,926,469
TOT	362,180	20,662,517	7,177,040	4,574,251	4,327,866	1,925,825	39,029,679

HDT	1	2	3	4	5	6	TOT
1	13,142	367	98	316	351	110	14,385
2	338	532,758	45,250	18,499	27,857	11,569	636,272
3	98	45,107	124,029	7,383	7,382	4,453	188,452
4	316	18,641	7,382	61,991	14,353	1,103	103,785
5	351	28,142	7,384	14,357	78,218	1,377	129,829
6	110	11,644	4,453	1,103	1,376	33,918	52,605
TOT	14,356	636,659	188,596	103,649	129,537	52,530	1,125,327

%

LM	1	2	3	4	5	6	TOT
1	1.00	1.01	1.00	1.00	1.00	0.95	1.000
2	1.01	1.01	1.01	1.00	1.00	1.05	1.012
3	1.00	1.01	1.00	1.00	1.00	1.03	1.001
4	1.00	1.00	1.00	1.00	1.00	0.96	1.000
5	1.00	1.00	1.00	1.00	1.00	0.96	1.000
6	0.91	1.05	0.98	0.94	0.95	1.01	1.013
TOT	1.00	1.01	1.00	1.00	1.00	1.01	1.007

HDT	1	2	3	4	5	6	TOT
1	1.00	1.01	1.00	1.00	1.00	1.06	1.001
2	1.02	1.00	0.99	1.00	1.00	0.97	0.998
3	1.00	0.99	1.00	1.00	1.00	0.97	0.998
4	1.00	1.00	1.00	1.00	1.00	0.93	0.999
5	1.00	1.00	1.00	1.00	1.00	0.97	0.999
6	1.06	0.98	0.97	0.93	0.97	1.01	0.994
TOT	1.00	1.00	1.00	1.00	1.00	0.99	0.998

Sub-regional Model Prototype

VMT Summary

*Ventura County is the focused area

Reg Mod

LM	VC SCCAB	SCAB	MDAB	SSAB	TOT
1	-	-	-	4,220,501	4,220,501
2	-	202,147,241	7,259,223	-	209,406,465
3	-	70,105,903	-	-	70,105,903
4	-	44,994,646	1,403,702	9,504,096	55,902,445
5	-	35,196,650	19,158,784	-	54,355,434
6	16,948,905	-	-	-	16,948,905
TOT	16,948,905	352,444,440	27,821,710	13,724,597	410,939,652

HDT	VC SCCAB	SCAB	MDAB	SSAB	TOT
1	-	-	-	519,691	519,691
2	-	12,846,952	347,707	-	13,194,659
3	-	3,481,161	-	-	3,481,161
4	-	2,839,859	749,949	1,247,660	4,837,468
5	-	2,404,558	3,611,983	-	6,016,541
6	1,407,494	-	-	-	1,407,494
TOT	1,407,494	21,572,531	4,709,638	1,767,351	29,457,015

Sub Mod

LM	VC SCCAB	SCAB	MDAB	SSAB	TOT
1	-	-	-	4,163,113	4,163,113
2	-	205,539,753	7,106,141	-	212,645,893
3	-	70,461,140	-	-	70,461,140
4	-	45,079,501	1,531,050	9,728,559	56,339,110
5	-	35,548,021	19,852,639	-	55,400,660
6	17,426,847	-	-	-	17,426,847
TOT	17,426,847	356,628,415	28,489,830	13,891,672	416,436,763

HDT	VC SCCAB	SCAB	MDAB	SSAB	TOT
1	-	-	-	518,179	518,179
2	-	12,593,576	344,249	-	12,937,825
3	-	3,461,271	-	-	3,461,271
4	-	2,830,855	760,352	1,252,824	4,844,030
5	-	2,385,040	3,643,331	-	6,028,371
6	1,407,913	-	-	-	1,407,913
TOT	1,407,913	21,270,742	4,747,932	1,771,003	29,197,590

%

LM	VC SCCAB	SCAB	MDAB	SSAB	TOT
1				0.99	0.99
2		1.02	0.98		1.02
3		1.01			1.01
4		1.00	1.09	1.02	1.01
5		1.01	1.04		1.02
6	1.03				1.03
TOT	1.03	1.01	1.02	1.01	1.01

HDT	VC SCCAB	SCAB	MDAB	SSAB	TOT
1				1.00	1.00
2		0.98	0.99		0.98
3		0.99			0.99
4		1.00	1.01	1.00	1.00
5		0.99	1.01		1.00
6	1.00				1.00
TOT	1.00	0.99	1.01	1.00	0.99

Question?

Thank You !

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APPENDIX C – SOCIOECONOMIC DATA

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Model SED File (model_sed_subregion.bin)

- **TAZ Identifier Variables**
  - **Zone IDs**
    - **TAZ_TIER1**: Tier 1 zone structure from the SCAG Regional travel demand model.
    - **Tier2Zone**: Tier 2 zone structure from the SCAG Regional travel demand model. These zones all end in zone numbers with a multiple of 100, and aggregate up to the Tier 1 zone structure. For example, Tier2Zones 60001100, 60001200, and 60001300 aggregate up to TAZ_TIER1 zone 60001000.
    - **SubregionTAZ, TAZ, TAZ_ID**: Identical value TAZ ID values. These are the zone numbers used by the model to assign SED and trips to zones. These are at the Tier 3 zone level in the SCAG Regional travel demand model. These zones all end in a single digit zone number, and aggregate up to the Tier 2 zone structure. For the purposes of the model, the Tier 3 zone structure is identical to the Tier 2 zone structure for Ventura County. For example, SubregionTAZ 60001101 is the same structure as Tier2Zone 60001100.
    - **INTERNAL_SEQUENCE_ID:** An internal sequential number ID that is used within the model internal calculation.
  - **CNTY**: County text identifier for "Ventura", "Los Angeles", "Imperial", "Orange", "Riverside", and "San Bernardino"
  - **PUMA5:** The public use microsample zone identifier used by SCAG. There are two PUMA groups used within Ventura County: Simi Valley and South Ventura, and Oxnard and North Ventura. PUMA5 is used within the vehicle availability model.
  - **DISTRICT:** A SCAG region identifier that is used within trip generation balancing and reporting. .
  - **CBD:** Central Business District flag (1=Yes, 0=No)
  - **RSA:** Regional Statistical Area used by SCAG in the Regional Travel Demand Model. There are 6 SCAG region RSAs that are within Ventura County.
  - **ZONETYPE:** Character field identifying zones within the SED file as "Internal" zones.
  - **CALIBRATION_FACTOR:** A factor developed and calibrated by SCAG for use in the trip distribution model for zonal level calibration. All zones within Ventura County have a calibration factor of 1.0 for "no impact".
- **Population Variables**
  - **POP:** Total zonal population. Total population is comprised of household and group quarters residents.
  - **RES:** Total number of residents living in the zone. This is the number of residents NOT living in group quarters.
  - **GN:** Total number of population living in non-institutional group quarters (ex. dormitories, military barracks, homeless shelters)
  - **Population by age bracket**
    - **AGE5-17:** Total number of population between the ages of 5 and 17
    - **AGE18-24:** Total number of population between the ages of 18 and 24
    - **AGE16-64:** Total number of population between the ages of 16 and 64
    - **AGE65_OVER:** Total population aged 65 and over

- **Household Variables**
  - **HH:** Total number of single-family and multi-family dwelling units
  - **SFDU:** Total number of single-family detached dwelling units
  - **MFDU:** Total number of multi-family dwelling units
  - **Household Size Variables**
    - **HHSIZE1:** Total number of households with 1 resident
    - **HHSIZE2:** Total number of households with 2 residents
    - **HHSIZE3:** Total number of households with 3 residents
    - **HHSIZE4:** Total number of households with 4 or more residents
  - **Home Ownership Variables**
    - **HO18_24:** Total number of households with a homeowner between the age of 18 and 24
    - **HO25_44:** Total number of households with a homeowner between the age of 25 and 44
    - **HO45_64:** Total number of households with a homeowner between the age of 45 and 64
    - **HO65_OVER:** Total number of households with a homeowner aged 65 and over
  - **Workers per Household Variables**
    - **HH_WRK0:** Number of households with 0 workers
    - **HH_WRK1:** Number of households with 1 worker
    - **HH_WRK2:** Number of households with 2 workers
    - **HH_WRK3:** Number of households with 3 or more workers
  - **Income Level Variables (in 2011 dollars)**
    - **LINC_HH:** Total number of households with "Low" income (less than $34,999)
    - **MINC_HH:** Total number of households with "Medium" income ($35,000 to $74,999)
    - **HINC_HH:** Total number of households with "High" income ($75,000 to $149,999)
    - **VHINC_HH:** Total number of households with "Very High" income ($150,000 or more)
- **Number of Students Variables**
  - **K12:** Number of students enrolled in public and private K-12 institutions
  - **COLLEGE:** Number of students enrolled in any public or private post-secondary school (college or university) that grants an associate degree or higher
- **Income**
  - **Workers by Income Variables (in 2011 dollars)**
    - **LINC_WRK:** Total number of workers with "Low" income (less than $34,999)
    - **MINC_WRK:** Total number of workers with "Medium" income ($35,000 to $74,999)
    - **HINC_WRK:** Total number of workers with "High" income ($75,000 or more)
  - **MEDIAN:** Median Household Income
  - **Households by Median Income**
    - **MEDIAN35K:** Total number of households with median income less than $34,999
    - **MEDIAN35_75:** Total number of households with median income between $35,000 and $74,999
    - **MEDIAN 75_150:** Total number of households with median income between $75,000 and $149,999

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        - **MEDIAN_150:** Total number of households with median income greater than $150,000
- **Employment**
    - **TOT_EMP:** Total number of employees in the zone
    - **Employees by Wage Level (in 2011 dollars)**
        - **TOTLOW_EMP:** Total number of employees making a "low" wage (less than $34,999)
        - **TOTMED_EMP:** Total number of employees making a "medium" wage ($35,000 to $74,999)
        - **TOTHIG_EMP:** Total number of employees making a "high" wage ($75,000 or more)
    - **Employees by Industry**
        - **AG_EMP:** Total number of agriculture and mining employees
        - **CONST_EMP:** Total number of construction employees
        - **MANU_EMP:** Total number of manufacturing employees
        - **WHOLE_EMP:** Total number of wholesale trade employees
        - **RET_EMP:** Total number of retail trade employees
        - **TRANS_EMP:** Total number of transportation, warehousing, and utility employees
        - **INFOR_EMP:** Total number of information employees
        - **FIRE_EMP:** Total number of financial activities employees
        - **PROF_EMP:** Total number of professional and business services employees
        - **EDUC_EMP:** Total number of education and health services employees
        - **ARTENT_EMP:** Total number of leisure and hospitality services employees
        - **OTHSER_EMP:** Total number of other services employees
        - **PUBADM_EMP:** Total number of public administration employees
- **Parking**
    - **DAILYPARK:** Cost of parking in the zone for an entire day, noted in cents.
- **Zone Area for Transit**
    - **PERCENT_25_BUS:** Percent of zone within a quarter mile of a bus stop.
    - **PERCENT_50_BUS:** Percent of zone within a half a mile of a bus stop
    - **PERCENT_25_RAIL:** Percent of zone within a quarter mile of a rail stop
    - **PERCENT_50_RAIL:** Percent of zone within a half a mile of a rail stop

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2016 Base Year

TAZ	Population	Dwelling Units			Employment													
		Total	Single Family	Multi-Family	Total	Agriculture	Construction	Manufacturing	Wholesale	Retail	Transportation	Information	Finance Real Estate and	Professional	Education	Arts & Entertainment	Other Services	Public
43404101	392	114	6	108	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404102	70	20	1	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404103	700	203	11	192	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404104	14	4	-	4	44	-	7	2	2	5	-	-	-	8	11	4	3	2
43404105	14	4	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404106	14	4	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404107	112	32	2	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404108	28	8	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404109	28	8	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404110	28	8	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404201	78	22	-	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404202	117	32	-	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404301	1,463	581	116	465	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404302	64	25	5	20	272	10	5	4	9	11	1	-	2	54	40	129	5	2
43404303	64	25	5	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404401	438	120	5	115	69	-	5	1	2	3	1	-	1	4	47	4	1	1
43404402	818	223	8	215	206	1	14	2	5	8	2	1	2	11	142	12	4	2
43404403	321	88	3	85	206	1	14	2	5	8	2	1	2	11	142	12	4	2
43404404	321	88	3	85	206	1	14	2	5	8	2	1	2	11	142	12	4	2
43404405	204	56	2	54	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404406	321	88	3	85	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404407	497	136	5	131	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404501	1,083	310	10	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404502	1,036	297	9	288	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404503	612	175	6	169	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404504	1,036	297	9	288	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404505	941	270	9	261	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43406101	162	51	7	44	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43406102	679	214	31	183	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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TAZ	Population	Dwelling Units			Employment													
		Total	Single Family	Multi-Family	Total	Agriculture	Construction	Manufacturing	Wholesale	Retail	Transportation	Information	Finance Real Estate and	Professional	Education	Arts & Entertainment	Other Services	Public
43406103	485	153	22	131	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43406104	129	41	6	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43406105	194	61	9	52	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43406106	1,616	511	74	437	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43406107	65	20	3	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43406108	388	123	18	105	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43406109	-	-	-	-	103	-	10	1	1	16	5	1	1	6	33	14	3	12
43406110	646	204	29	175	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43406111	1,293	408	59	349	1,186	2	112	12	14	185	55	15	15	72	375	158	32	139
43406112	65	20	3	17	773	-	73	8	9	121	36	10	10	47	244	103	21	91
43406113	646	204	29	175	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43406114	97	31	4	27	516	-	49	5	6	81	24	6	7	31	163	69	14	61
43406201	391	128	8	120	571	1	72	10	9	54	11	5	9	45	242	59	44	10
43406202	6	2	-	2	30	1	4	1	-	3	1	-	-	2	13	3	2	-
43406203	170	56	3	53	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43407101	577	166	6	160	8	1	1	-	-	1	-	-	-	2	1	-	1	1
43407102	865	249	9	240	11	1	1	-	-	2	-	-	-	3	1	1	1	1
43407103	577	166	6	160	8	1	1	-	-	1	-	-	-	2	1	-	1	1
43407104	865	249	9	240	11	1	1	-	-	2	-	-	-	3	1	1	1	1
43407201	1,472	394	123	271	26	-	3	1	1	3	1	1	1	2	11	3	1	1
43407202	1,205	322	100	222	26	-	3	1	1	3	1	1	1	2	11	3	1	1
43407301	752	270	75	195	768	2	73	7	3	27	7	17	22	41	463	82	16	8
43407302	282	101	28	73	192	-	18	2	1	7	2	4	6	10	116	21	4	2
43407303	188	68	19	49	256	2	24	2	1	9	2	6	7	14	154	27	5	3
43407304	658	237	66	171	64	-	6	1	-	2	1	1	2	3	39	7	1	1
43409101	194	113	4	109	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43409102	194	113	4	109	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43409103	1,550	907	30	877	417	1	7	4	8	140	9	5	21	79	93	32	12	6
43409201	1,072	318	10	308	11	1	4	-	-	1	-	-	-	-	1	-	4	-
43409202	357	106	3	103	100	-	38	1	-	5	1	-	1	2	7	3	41	2
43409301	1,023	360	155	205	270	-	16	3	4	15	1	3	1	14	162	45	4	2
43409302	853	300	129	171	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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TAZ	Population	Dwelling Units			Employment													
		Total	Single Family	Multi-Family	Total	Agriculture	Construction	Manufacturing	Wholesale	Retail	Transportation	Information	Finance Real Estate and	Professional	Education	Arts & Entertainment	Other Services	Public
43409303	43	15	6	9	88	-	5	1	1	5	-	1	-	5	53	15	1	1
43409304	1,279	450	194	256	88	-	5	1	1	5	-	1	-	5	53	15	1	1
43409305	1,066	375	162	213	88	-	5	1	1	5	-	1	-	5	53	15	1	1
43409306	-	-	-	-	168	1	10	2	2	9	1	2	-	9	101	28	2	1
43409401	880	425	16	409	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43409402	1,075	520	19	501	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43410101	682	211	163	48	121	-	7	7	2	25	3	-	2	27	36	9	2	1
43410102	146	45	35	10	148	1	8	8	3	31	3	1	2	32	45	11	2	1
43410103	146	45	35	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43410201	-	-	-	-	1,396	10	92	76	32	265	35	10	20	298	412	109	25	12
43410202	-	-	-	-	305	2	20	16	7	58	8	2	4	65	90	24	6	3
43410203	-	-	-	-	436	2	29	24	10	83	11	3	6	93	129	34	8	4
43410204	133	39	35	4	436	2	29	24	10	83	11	3	6	93	129	34	8	4
43410205	-	-	-	-	305	2	20	16	7	58	8	2	4	65	90	24	6	3
43410206	-	-	-	-	873	5	58	47	20	166	22	6	13	186	258	68	16	8
43410207	-	-	-	-	436	2	29	24	10	83	11	3	6	93	129	34	8	4
43410208	-	-	-	-	175	1	12	9	4	33	4	1	3	37	52	14	3	2
43410301	-	-	-	-	301	-	25	15	7	50	8	3	5	60	90	26	8	4
43410302	-	-	-	-	100	1	8	5	2	17	3	1	2	20	30	8	2	1
43410303	-	-	-	-	10	1	1	-	-	2	-	-	-	2	3	1	-	-
43410304	-	-	-	-	281	-	23	14	6	47	8	3	5	56	84	24	7	4
43410305	-	-	-	-	10	1	1	-	-	2	-	-	-	2	3	1	-	-
43410306	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43410307	44	13	11	2	301	-	25	15	7	50	8	3	5	60	90	26	8	4
43410308	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43410401	-	-	-	-	52	-	5	2	1	8	2	1	1	9	15	5	2	1
43410402	-	-	-	-	310	1	28	13	7	49	11	4	6	55	88	31	10	7
43410403	-	-	-	-	52	-	5	2	1	8	2	1	1	9	15	5	2	1
43410404	-	-	-	-	52	-	5	2	1	8	2	1	1	9	15	5	2	1
43410405	120	35	30	5	52	-	5	2	1	8	2	1	1	9	15	5	2	1
43410501	426	167	148	19	349	4	23	19	8	64	9	3	6	71	103	28	8	3
43410502	426	167	148	19	188	-	13	10	4	35	5	2	4	39	56	15	4	2

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TAZ	Population	Dwelling Units			Employment													
		Total	Single Family	Multi-Family	Total	Agriculture	Construction	Manufacturing	Wholesale	Retail	Transportation	Information	Finance Real Estate and	Professional	Education	Arts & Entertainment	Other Services	Public
43410601	-	-	-	-	577	-	37	33	13	108	15	4	9	124	173	46	10	5
43410602	5	3	1	2	577	-	37	33	13	108	15	4	9	124	173	46	10	5
43410701	172	60	44	16	442	1	27	9	7	63	4	3	4	113	85	36	19	71
43410702	319	112	83	29	541	-	34	10	9	78	4	4	5	138	104	45	24	86
43410801	1,299	533	402	131	567	2	32	11	10	83	5	4	5	145	106	46	26	92
43410802	-	-	-	-	243	-	14	5	4	36	2	2	2	62	46	20	11	40
43411201	71	21	1	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43411202	817	240	10	230	1	1	-	-	-	-	-	-	-	-	-	-	-	-
43411203	533	156	7	149	1	1	-	-	-	-	-	-	-	-	-	-	-	-
43411204	533	156	7	149	1	1	-	-	-	-	-	-	-	-	-	-	-	-
43411205	888	261	11	250	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43411206	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43411207	71	21	1	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43411208	320	94	4	90	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43411209	320	94	4	90	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43411301	1,223	397	60	337	162	1	25	9	16	49	2	1	2	13	18	14	8	4
43411302	24	8	1	7	23	2	4	1	2	7	-	-	-	2	2	2	1	-
43411303	528	171	26	145	23	2	4	1	2	7	-	-	-	2	2	2	1	-
43411304	-	-	-	-	231	-	36	14	24	70	4	1	3	19	25	21	11	5
43411305	528	171	26	145	23	2	4	1	2	7	-	-	-	2	2	2	1	-
43411306	96	31	5	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43413101	-	-	-	-	6	-	-	-	-	6	-	-	-	-	-	-	-	-
43413201	8	3	2	1	495	-	26	7	3	25	9	3	11	28	336	32	10	5
43413202	72	25	17	8	118	-	6	2	1	6	2	1	3	7	80	8	2	1
43413203	21	7	5	2	118	-	6	2	1	6	2	1	3	7	80	8	2	1
43413204	-	-	-	-	118	-	6	2	1	6	2	1	3	7	80	8	2	1
43413205	421	145	98	47	472	1	25	7	3	24	8	3	11	26	321	30	9	4
43413206	-	-	-	-	236	2	13	3	1	12	4	1	5	13	160	15	5	2
43413207	-	-	-	-	472	1	25	7	3	24	8	3	11	26	321	30	9	4
43413208	2,485	854	579	275	236	2	13	3	1	12	4	1	5	13	160	15	5	2
43413209	-	-	-	-	47	1	2	1	-	2	1	-	1	3	32	3	1	-
43413210	-	-	-	-	47	1	2	1	-	2	1	-	1	3	32	3	1	-

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TAZ	Population	Dwelling Units			Employment													
		Total	Single Family	Multi-Family	Total	Agriculture	Construction	Manufacturing	Wholesale	Retail	Transportation	Information	Finance Real Estate and	Professional	Education	Arts & Entertainment	Other Services	Public
43413301	1,128	356	69	287	271	-	4	2	1	21	3	25	4	20	140	37	11	3
43413302	635	200	38	162	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43413303	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43413304	-	-	-	-	1,084	-	17	6	6	84	11	100	17	81	558	149	43	12
43413401	499	190	41	149	11	-	2	2	1	1	-	-	-	3	2	-	1	-
43413402	999	380	83	297	128	1	18	26	8	14	-	-	-	34	19	1	6	1
43413403	999	380	83	297	128	1	18	26	8	14	-	-	-	34	19	1	6	1
43413404	156	59	13	46	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43413405	156	59	13	46	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43413406	312	119	26	93	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43414101	2,966	898	72	826	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43414102	647	196	16	180	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43414103	1,510	457	37	420	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43414104	647	196	16	180	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43414105	593	180	14	166	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43414106	1,186	359	29	330	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43414107	539	163	13	150	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43414108	647	196	16	180	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43414109	-	-	-	-	662	1	172	43	82	73	5	1	23	43	104	14	96	5
43414110	431	131	11	120	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43414111	1,618	490	39	451	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43415101	64	20	2	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43415102	156	49	5	44	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43415103	-	-	-	-	133	-	19	7	5	13	5	2	3	17	37	14	6	5
43415104	301	95	9	86	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43415105	82	26	2	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43415201	-	-	-	-	558	5	69	103	72	43	27	12	14	74	62	34	13	30
43415202	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43415203	-	-	-	-	457	4	56	84	59	35	23	9	12	61	51	28	10	25
43415401	-	-	-	-	455	4	56	85	59	36	22	9	12	60	49	27	11	25
43415402	-	-	-	-	393	4	48	74	51	31	19	8	10	52	42	23	10	21
43415403	-	-	-	-	330	2	40	62	43	26	16	7	8	44	36	20	8	18

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TAZ	Population	Dwelling Units			Employment													
		Total	Single Family	Multi-Family	Total	Agriculture	Construction	Manufacturing	Wholesale	Retail	Transportation	Information	Finance Real Estate and	Professional	Education	Arts & Entertainment	Other Services	Public
43415601	18	6	4	2	96	2	11	15	10	8	5	2	2	12	14	7	3	5
43415602	146	46	27	19	766	9	91	118	80	66	36	15	19	97	114	58	26	37
43415603	201	63	37	26	1,053	12	125	162	110	91	50	21	26	134	156	79	36	51
43416101	-	-	-	-	304	-	14	4	2	137	3	1	10	16	63	43	8	3
43416102	1,633	473	13	460	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43416103	817	237	7	230	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43416104	-	-	-	-	228	-	10	3	2	103	2	1	8	12	47	32	6	2
43416105	-	-	-	-	228	-	10	3	2	103	2	1	8	12	47	32	6	2
43416106	408	118	3	115	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43416107	408	118	3	115	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43416201	-	-	-	-	147	1	5	1	1	50	5	1	4	10	38	14	15	2
43416202	700	216	6	210	147	1	5	1	1	50	5	1	4	10	38	14	15	2
43416203	-	-	-	-	33	2	1	-	-	11	1	-	1	2	9	3	3	-
43416204	314	97	3	94	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43416205	314	97	3	94	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43416206	1,086	336	10	326	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43417101	45	13	4	9	50	2	5	-	-	2	-	-	1	2	31	6	1	-
43417102	-	-	-	-	391	-	37	3	2	13	3	1	6	19	245	50	8	4
43417103	1,815	537	175	362	11	1	1	-	-	-	-	-	-	1	7	1	-	-
43417104	998	295	96	199	84	-	8	1	-	3	1	-	1	4	53	11	2	1
43417105	454	134	44	90	11	1	1	-	-	-	-	-	-	1	7	1	-	-
43417106	1,134	336	110	226	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43417107	91	27	9	18	11	1	1	-	-	-	-	-	-	1	7	1	-	-
43417201	1,421	390	90	300	224	2	21	5	-	15	-	-	9	40	19	31	81	1
43417202	1,311	360	84	276	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43417203	619	170	39	131	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43417204	291	80	19	61	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43417301	-	-	-	-	21	-	3	1	-	4	-	-	-	2	4	3	3	1
43417302	1,138	380	112	268	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43417303	569	190	56	134	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43417304	142	47	14	33	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43417401	437	111	11	100	42	1	1	-	-	12	1	-	2	1	4	15	4	1

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TAZ	Population	Dwelling Units			Employment													
		Total	Single Family	Multi-Family	Total	Agriculture	Construction	Manufacturing	Wholesale	Retail	Transportation	Information	Finance Real Estate and	Professional	Education	Arts & Entertainment	Other Services	Public
43417402	209	53	5	48	506	-	17	5	3	145	10	4	25	16	47	176	51	7
43417403	209	53	5	48	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43417404	475	121	12	109	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43417405	570	145	15	130	169	1	6	2	1	48	3	1	8	5	16	59	17	2
43417406	-	-	-	-	42	1	1	-	-	12	1	-	2	1	4	15	4	1
43417407	-	-	-	-	42	1	1	-	-	12	1	-	2	1	4	15	4	1
43417408	-	-	-	-	42	1	1	-	-	12	1	-	2	1	4	15	4	1
43420101	2,300	833	318	515	84	1	1	-	-	1	-	1	3	4	63	2	8	-
43420102	256	93	35	58	756	-	10	4	2	9	3	5	31	32	566	21	70	4
43420201	159	52	23	29	279	-	16	50	26	55	4	5	2	20	54	40	6	3
43420202	159	52	23	29	837	1	47	149	77	164	11	15	5	61	163	119	17	8
43420203	951	314	138	176	279	-	16	50	26	55	4	5	2	20	54	40	6	3
43420204	317	105	46	59	1,256	2	70	223	116	246	17	22	8	91	244	178	26	13
43420205	1,586	524	231	293	140	1	8	25	13	27	2	2	1	10	27	20	3	1
43420301	1,512	440	172	268	47	1	4	4	2	9	1	1	1	4	11	6	2	1
43420302	302	88	34	54	63	2	6	5	3	12	1	1	1	6	14	8	3	1
43420303	1,210	352	138	214	47	1	4	4	2	9	1	1	1	4	11	6	2	1
43421101	473	192	94	98	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43421102	650	264	129	135	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43421103	1,477	601	295	306	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43421104	473	192	94	98	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43421105	177	72	35	37	1,007	4	41	8	5	104	34	2	4	60	154	542	40	9
43421106	1,477	601	295	306	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43421107	1,182	481	236	245	112	-	5	1	1	12	4	-	1	7	17	60	5	1
43421201	525	173	36	137	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43421202	50	16	3	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43421203	38	12	2	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43421204	988	325	68	257	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43421205	625	206	43	163	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43421206	275	91	19	72	42	-	2	-	3	24	2	-	1	1	2	6	1	-
43421301	70	24	9	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43421302	52	18	7	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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TAZ	Population	Dwelling Units			Employment													
		Total	Single Family	Multi-Family	Total	Agriculture	Construction	Manufacturing	Wholesale	Retail	Transportation	Information	Finance Real Estate and	Professional	Education	Arts & Entertainment	Other Services	Public
43421303	52	18	7	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43422101	767	194	9	185	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43422102	256	65	3	62	123	-	5	2	1	6	2	1	2	7	81	9	6	2
43422103	256	65	3	62	25	2	1	-	-	1	-	-	-	1	17	2	1	-
43422104	-	-	-	-	98	-	4	2	1	4	2	1	2	6	65	7	5	1
43422201	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43422202	199	52	1	51	192	1	13	4	2	16	3	2	3	13	107	17	8	3
43422203	895	236	6	230	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43422204	895	236	6	230	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43422301	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43422302	996	270	11	259	22	2	1	-	-	2	-	-	-	2	14	-	1	-
43422303	569	154	6	148	22	2	1	-	-	2	-	-	-	2	14	-	1	-
43422304	569	154	6	148	22	2	1	-	-	2	-	-	-	2	14	-	1	-
43422305	1,067	290	12	278	22	2	1	-	-	2	-	-	-	2	14	-	1	-
43422306	1,138	309	13	296	35	2	1	-	-	3	1	-	-	3	22	1	2	-
43422307	1,138	309	13	296	35	2	1	-	-	3	1	-	-	3	22	1	2	-
43422308	1,636	444	19	425	29	-	1	-	-	2	1	-	-	3	19	1	2	-
43422401	235	55	2	53	1	-	-	-	-	1	-	-	-	-	-	-	-	-
43422402	565	133	5	128	14	-	-	-	-	7	-	-	-	1	5	-	1	1
43422403	47	11	-	11	1	-	-	-	-	1	-	-	-	-	-	-	-	-
43422404	47	11	-	11	2	-	-	-	-	1	-	-	-	-	1	-	-	-
43422405	47	11	-	11	2	-	-	-	-	1	-	-	-	-	1	-	-	-
43422501	17	5	-	5	7	-	1	-	-	2	-	-	-	1	3	-	1	-
43422502	83	26	1	25	10	-	1	-	-	3	-	-	-	1	4	-	1	-
43422503	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43422504	17	5	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43422505	50	16	1	15	7	-	1	-	-	2	-	-	-	1	3	-	1	-
43423101	257	69	22	47	9	-	2	-	-	1	-	-	4	1	1	-	-	-
43423102	37	10	3	7	1	1	-	-	-	-	-	-	-	-	-	-	-	-
43423103	37	10	3	7	1	1	-	-	-	-	-	-	-	-	-	-	-	-
43423104	74	20	6	14	3	1	1	-	-	-	-	-	1	-	-	-	-	-
43423105	74	20	6	14	3	1	1	-	-	-	-	-	1	-	-	-	-	-

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TAZ	Population	Dwelling Units			Employment													
		Total	Single Family	Multi-Family	Total	Agriculture	Construction	Manufacturing	Wholesale	Retail	Transportation	Information	Finance Real Estate and	Professional	Education	Arts & Entertainment	Other Services	Public
43423106	257	69	22	47	9	-	2	-	-	1	-	-	4	1	1	-	-	-
43423201	-	-	-	-	24	-	5	1	1	2	1	1	1	3	6	2	1	1
43423202	-	-	-	-	12	2	2	-	-	1	-	-	-	2	3	1	1	-
43423203	-	-	-	-	95	1	18	3	2	9	3	2	3	12	25	10	5	2
43423204	-	-	-	-	12	2	2	-	-	1	-	-	-	2	3	1	1	-
43423205	-	-	-	-	71	1	13	2	2	7	2	1	2	9	19	7	4	2
43423206	-	-	-	-	12	2	2	-	-	1	-	-	-	2	3	1	1	-
43423207	1,390	470	93	377	12	2	2	-	-	1	-	-	-	2	3	1	1	-
43423301	-	-	-	-	347	2	68	4	5	40	4	8	19	61	75	43	13	5
43423302	1,868	521	83	438	19	2	4	-	-	2	-	-	1	3	4	2	1	-
43423303	859	239	38	201	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43423304	1,313	366	58	308	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43423305	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43423306	1,010	282	45	237	19	2	4	-	-	2	-	-	1	3	4	2	1	-
43423401	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43423402	148	40	5	35	31	-	7	1	1	3	1	1	1	4	8	3	1	1
43423403	-	-	-	-	31	-	7	1	1	3	1	1	1	4	8	3	1	1
43423404	148	40	5	35	16	-	3	1	-	1	1	-	1	2	4	2	1	-
43423405	-	-	-	-	233	6	49	8	5	19	7	5	7	31	58	22	11	5
43423406	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43423407	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43423408	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43423501	1,192	302	29	273	14	-	-	-	-	8	-	-	5	-	-	-	-	1
43423502	75	19	2	17	1	-	-	-	-	1	-	-	-	-	-	-	-	-
43423503	149	38	4	34	2	-	-	-	-	1	-	-	1	-	-	-	-	-
43423504	75	19	2	17	1	-	-	-	-	1	-	-	-	-	-	-	-	-
43423601	76	25	6	19	239	1	25	14	7	30	12	5	9	27	58	30	12	9
43423602	76	25	6	19	239	1	25	14	7	30	12	5	9	27	58	30	12	9
43423701	664	203	50	153	29	-	7	1	1	5	-	-	1	5	5	4	1	2
43423702	664	203	50	153	29	-	7	1	1	5	-	-	1	5	5	4	1	2
43433301	-	-	-	-	55	-	8	1	2	6	2	1	11	4	11	4	3	2
43433302	178	54	5	49	4	1	1	-	-	-	-	-	1	-	1	-	-	-

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TAZ	Population	Dwelling Units			Employment													
		Total	Single Family	Multi-Family	Total	Agriculture	Construction	Manufacturing	Wholesale	Retail	Transportation	Information	Finance Real Estate and	Professional	Education	Arts & Entertainment	Other Services	Public
43433303	178	54	5	49	4	1	1	-	-	-	-	-	1	-	1	-	-	-
43433304	297	91	9	82	4	1	1	-	-	-	-	-	1	-	1	-	-	-
43433305	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43433306	59	18	2	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43433307	59	18	2	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43433308	59	18	2	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43433309	59	18	2	16	4	1	1	-	-	-	-	-	1	-	1	-	-	-
43433310	59	18	2	16	4	1	1	-	-	-	-	-	1	-	1	-	-	-
43433311	237	73	7	66	4	1	1	-	-	-	-	-	1	-	1	-	-	-

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2040 Forecast Year

TAZ	Population	Dwelling Units			Employment													
		Total	Single Family	Multi-Family	Total	Agriculture	Construction	Manufacturing	Wholesale	Retail	Transportation	Information	Finance Real Estate and	Professional	Education	Arts & Entertainment	Other Services	Public
43404101	508	169	119	50	1	1	-	-	-	-	-	-	-	-	-	-	-	-
43404102	508	169	119	50	4	-	2	-	-	-	-	-	-	-	-	-	-	2
43404103	1,375	458	323	135	1	1	-	-	-	-	-	-	-	-	-	-	-	-
43404104	189	63	45	18	73	-	-	-	-	73	-	-	-	-	-	-	-	-
43404105	1,034	345	243	102	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404106	1,213	404	284	120	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404107	170	57	40	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404108	49	16	12	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404109	49	16	12	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404110	49	16	12	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404201	100	33	23	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404202	170	57	41	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404301	2,077	692	487	205	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404302	221	68	48	20	35	-	7	1	1	5	2	1	2	8	5	3	3	-
43404303	221	68	48	20	35	-	7	1	1	5	2	1	2	8	5	3	3	-
43404401	508	169	118	51	69	-	28	-	-	-	-	-	28	14	-	-	-	-
43404402	877	292	205	87	206	-	4	-	-	199	-	-	-	-	-	-	-	3
43404403	368	123	87	36	206	-	-	-	-	206	-	-	-	-	-	-	-	-
43404404	368	123	87	36	206	-	-	-	-	206	-	-	-	-	-	-	-	-
43404405	231	77	55	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404406	366	122	86	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404407	969	323	228	95	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404501	1,141	380	267	113	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404502	1,141	380	267	113	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404503	655	218	154	64	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404504	1,072	357	251	106	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43404505	941	270	189	81	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43406101	162	51	36	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43406102	700	233	165	68	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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TAZ	Population	Dwelling Units			Employment													
		Total	Single Family	Multi-Family	Total	Agriculture	Construction	Manufacturing	Wholesale	Retail	Transportation	Information	Finance Real Estate and	Professional	Education	Arts & Entertainment	Other Services	Public
43406103	489	163	116	47	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43406104	212	71	51	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43406105	305	104	73	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43406106	2,205	735	518	217	10	-	5	-	-	-	-	-	-	2	3	-	-	-
43406107	212	71	51	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43406108	440	147	104	43	35	-	-	-	-	35	-	-	-	-	-	-	-	-
43406109	-	-	-	-	115	-	-	-	-	115	-	-	-	-	-	-	-	-
43406110	835	278	196	82	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43406111	1,515	505	356	149	1,376	-	-	-	-	1,376	-	-	-	-	-	-	-	-
43406112	93	31	21	10	845	-	-	-	-	845	-	-	-	-	-	-	-	-
43406113	920	307	216	91	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43406114	122	41	29	12	647	-	-	-	-	647	-	-	-	-	-	-	-	-
43406201	751	233	165	68	161	1	15	4	3	24	10	1	25	27	24	19	11	-
43406202	751	233	165	68	161	1	15	4	3	24	10	1	25	27	24	19	11	-
43406203	804	268	189	79	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43407101	577	166	117	49	8	1	1	-	-	1	-	-	-	2	1	-	1	1
43407102	865	249	175	74	11	1	1	-	-	2	-	-	-	3	1	1	1	1
43407103	577	166	117	49	8	1	1	-	-	1	-	-	-	2	1	-	1	1
43407104	865	249	175	74	11	1	1	-	-	2	-	-	-	3	1	1	1	1
43407201	1,499	500	349	151	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43407202	786	262	183	79	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43407301	372	123	86	37	533	1	27	4	3	86	4	2	6	38	323	25	11	4
43407302	372	123	86	37	533	1	27	4	3	86	4	2	6	38	323	25	11	4
43407303	372	123	86	37	533	1	27	4	3	86	4	2	6	38	323	25	11	4
43407304	518	186	130	56	471	3	92	16	13	65	17	4	26	107	60	34	34	-
43409101	366	122	86	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43409102	1,706	569	401	168	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43409103	1,706	569	401	168	470	-	-	-	-	470	-	-	-	-	-	-	-	-
43409201	989	330	310	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43409202	360	120	112	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43409301	1,233	411	289	122	173	-	2	-	-	168	-	-	-	1	2	-	-	1
43409302	1,172	391	275	116	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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TAZ	Population	Dwelling Units			Employment													
		Total	Single Family	Multi-Family	Total	Agriculture	Construction	Manufacturing	Wholesale	Retail	Transportation	Information	Finance Real Estate and	Professional	Education	Arts & Entertainment	Other Services	Public
43409303	76	25	18	7	90	2	17	2	2	-	1	-	2	17	28	3	3	12
43409304	1,514	505	355	150	90	2	17	2	2	-	1	-	2	17	28	3	3	12
43409305	1,318	439	309	130	90	2	17	2	2	-	1	-	2	17	28	3	3	12
43409306	-	-	-	-	173	-	2	-	-	168	-	-	-	1	2	-	-	1
43409401	989	330	314	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43409402	1,706	569	541	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43410101	1,262	421	134	287	115	1	19	2	2	-	3	1	2	16	8	3	7	51
43410102	196	65	20	45	145	2	23	3	4	-	4	1	2	20	10	4	8	64
43410103	177	59	18	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43410201	-	-	-	-	1,664	-	490	317	2	-	105	-	89	10	-	-	23	628
43410202	-	-	-	-	1,312	-	387	251	2	-	82	-	69	8	-	-	18	495
43410203	-	-	-	-	1,738	-	270	175	1	823	57	-	48	6	-	-	13	345
43410204	96	32	21	11	851	-	251	163	1	-	53	-	45	5	-	-	12	321
43410205	-	-	-	-	1,034	-	305	197	1	-	65	-	55	6	-	-	15	390
43410206	-	-	-	-	1,611	-	475	308	2	-	101	-	85	10	-	-	23	607
43410207	-	-	-	-	440	-	130	85	-	-	27	-	23	3	-	-	6	166
43410208	-	-	-	-	196	-	58	37	-	-	12	-	10	2	-	-	3	74
43410301	-	-	-	-	321	-	-	-	-	321	-	-	-	-	-	-	-	-
43410302	-	-	-	-	1,551	-	-	-	-	1,551	-	-	-	-	-	-	-	-
43410303	-	-	-	-	1,139	-	-	-	-	1,139	-	-	-	-	-	-	-	-
43410304	-	-	-	-	1,095	-	34	257	139	61	-	144	45	103	182	-	130	-
43410305	22	7	2	5	1,130	-	46	358	159	47	-	79	57	133	141	-	110	-
43410306	-	-	-	-	813	-	119	297	123	-	-	-	40	226	-	-	8	-
43410307	19	6	1	5	1,099	-	40	346	155	48	-	80	50	135	142	-	103	-
43410308	-	-	-	-	983	-	8	263	111	161	-	79	40	79	141	-	101	-
43410401	-	-	-	-	564	-	242	17	13	-	-	20	13	209	7	-	43	-
43410402	-	-	-	-	558	-	239	16	13	-	-	20	14	206	7	-	43	-
43410403	-	-	-	-	1,214	-	521	36	29	-	-	43	21	457	14	-	93	-
43410404	-	-	-	-	1,066	-	458	31	25	-	-	38	19	399	13	-	82	-
43410405	51	17	2	15	1,332	-	281	182	26	74	-	128	26	144	236	-	235	-
43410501	896	299	66	233	1,355	-	-	-	-	1,355	-	-	-	-	-	-	-	-
43410502	719	241	54	187	213	-	-	-	-	213	-	-	-	-	-	-	-	-

TAZ	Population	Dwelling Units			Employment													
		Total	Single Family	Multi-Family	Total	Agriculture	Construction	Manufacturing	Wholesale	Retail	Transportation	Information	Finance Real Estate and	Professional	Education	Arts & Entertainment	Other Services	Public
43410601	-	-	-	-	1,033	-	-	-	-	1,033	-	-	-	-	-	-	-	-
43410602	476	158	158	-	1,317	-	-	-	-	1,317	-	-	-	-	-	-	-	-
43410701	193	64	21	43	572	21	49	4	2	106	125	-	13	56	9	6	72	109
43410702	356	119	39	80	804	22	52	4	2	313	132	-	13	59	10	7	76	114
43410801	1,923	641	213	428	1,186	-	-	-	-	1,186	-	-	-	-	-	-	-	-
43410802	-	-	-	-	649	-	-	-	-	649	-	-	-	-	-	-	-	-
43411201	93	31	21	10	5	2	2	-	-	-	-	-	-	1	-	-	-	-
43411202	989	330	232	98	1	-	-	-	-	-	-	-	-	-	-	-	-	-
43411203	797	266	188	78	1	-	-	-	-	-	-	-	-	-	-	-	-	-
43411204	797	266	188	78	1	-	-	-	-	-	-	-	-	-	-	-	-	-
43411205	1,647	549	386	163	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43411206	26	9	7	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43411207	99	33	24	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43411208	366	122	86	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43411209	372	124	88	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43411301	1,223	397	280	117	162	1	25	9	16	49	2	1	2	13	18	14	8	4
43411302	1,230	428	350	78	961	89	-	59	141	-	30	150	59	177	89	59	119	-
43411303	536	179	126	53	287	7	66	5	57	102	3	-	5	23	7	5	9	-
43411304	-	-	-	-	1,387	13	130	9	112	1,025	4	-	9	45	13	9	18	-
43411305	536	179	126	53	287	7	66	5	57	102	3	-	5	23	7	5	9	-
43411306	107	36	26	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43413101	-	-	-	-	4,407	92	563	129	56	2,003	48	24	157	571	185	197	153	229
43413201	8	3	2	1	796	-	-	-	-	796	-	-	-	-	-	-	-	-
43413202	74	25	17	8	2,195	-	-	-	-	2,195	-	-	-	-	-	-	-	-
43413203	21	7	5	2	1,768	-	-	-	-	1,768	-	-	-	-	-	-	-	-
43413204	-	-	-	-	965	1	15	4	1	806	1	-	8	29	72	23	5	-
43413205	462	154	108	46	1,053	5	109	31	5	224	10	37	55	50	320	170	37	-
43413206	-	-	-	-	1,021	3	60	17	3	384	6	-	31	118	287	94	21	-
43413207	-	-	-	-	1,021	3	60	17	3	384	6	-	31	118	287	94	21	-
43413208	2,934	978	689	289	702	-	-	-	-	702	-	-	-	-	-	-	-	-
43413209	-	-	-	-	299	-	-	-	-	299	-	-	-	-	-	-	-	-
43413210	-	-	-	-	299	-	-	-	-	299	-	-	-	-	-	-	-	-

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TAZ	Population	Dwelling Units			Employment													
		Total	Single Family	Multi-Family	Total	Agriculture	Construction	Manufacturing	Wholesale	Retail	Transportation	Information	Finance Real Estate and	Professional	Education	Arts & Entertainment	Other Services	Public
43413301	1,101	367	290	77	324	-	-	-	-	324	-	-	-	-	-	-	-	-
43413302	636	212	168	44	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43413303	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43413304	-	-	-	-	1,251	-	-	-	-	1,251	-	-	-	-	-	-	-	-
43413401	1,168	371	261	110	15	2	2	-	-	-	-	-	1	3	2	4	1	-
43413402	1,154	385	271	114	139	-	-	-	-	139	-	-	-	-	-	-	-	-
43413403	1,154	385	271	114	139	-	-	-	-	139	-	-	-	-	-	-	-	-
43413404	212	71	49	22	5	1	1	-	-	-	-	-	1	1	1	2	1	-
43413405	212	71	49	22	5	1	1	-	-	-	-	-	1	1	1	2	1	-
43413406	360	120	85	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43414101	2,966	898	633	265	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43414102	668	223	158	65	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43414103	1,550	517	365	152	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43414104	661	220	155	65	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43414105	603	201	142	59	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43414106	1,217	406	286	120	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43414107	668	223	158	65	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43414108	668	223	158	65	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43414109	-	-	-	-	662	7	41	9	4	486	3	1	12	42	13	15	12	16
43414110	440	147	104	43	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43414111	1,881	627	442	185	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43415101	74	25	22	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43415102	161	54	48	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43415103	-	-	-	-	133	-	40	22	18	-	-	-	18	31	4	-	-	-
43415104	301	95	83	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43415105	82	26	23	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43415201	-	-	-	-	906	-	261	307	182	-	-	24	-	61	45	17	9	-
43415202	-	-	-	-	5	-	2	2	1	-	-	-	-	1	1	-	-	-
43415203	-	-	-	-	908	-	262	307	182	-	-	24	-	61	46	17	9	-
43415401	-	-	-	-	580	26	219	125	52	-	-	3	7	53	1	13	81	-
43415402	-	-	-	-	448	20	169	97	41	-	-	3	6	41	1	10	63	-
43415403	-	-	-	-	344	16	130	74	31	-	-	2	4	31	1	8	48	-

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TAZ	Population	Dwelling Units			Employment													
		Total	Single Family	Multi-Family	Total	Agriculture	Construction	Manufacturing	Wholesale	Retail	Transportation	Information	Finance Real Estate and	Professional	Education	Arts & Entertainment	Other Services	Public
43415601	-	-	-	-	1,104	-	131	38	33	178	5	31	166	279	118	105	20	1
43415602	-	-	-	-	1,104	-	131	38	33	178	5	31	166	279	118	105	20	1
43415603	-	-	-	-	1,104	-	131	38	33	178	5	31	166	279	118	105	20	1
43416101	-	-	-	-	643	-	-	-	-	643	-	-	-	-	-	-	-	-
43416102	1,633	473	332	141	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43416103	822	274	193	81	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43416104	-	-	-	-	263	-	-	-	-	263	-	-	-	-	-	-	-	-
43416105	-	-	-	-	263	-	-	-	-	263	-	-	-	-	-	-	-	-
43416106	419	140	99	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43416107	419	140	99	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43416201	-	-	-	-	263	-	-	-	-	263	-	-	-	-	-	-	-	-
43416202	703	234	165	69	263	-	-	-	-	263	-	-	-	-	-	-	-	-
43416203	-	-	-	-	153	1	2	1	-	138	-	-	1	5	1	3	1	-
43416204	318	106	75	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43416205	318	106	75	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43416206	1,086	336	236	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43417101	449	150	106	44	276	-	-	-	-	276	-	-	-	-	-	-	-	-
43417102	-	-	-	-	474	-	-	-	-	474	-	-	-	-	-	-	-	-
43417103	1,944	647	456	191	42	2	12	1	1	-	1	-	3	8	2	1	2	9
43417104	1,082	361	254	107	172	-	-	-	-	172	-	-	-	-	-	-	-	-
43417105	565	188	132	56	558	-	-	-	-	558	-	-	-	-	-	-	-	-
43417106	1,168	389	274	115	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43417107	1,257	354	249	105	644	3	92	17	13	159	49	18	44	120	41	49	38	-
43417201	1,421	390	275	115	272	-	-	-	-	272	-	-	-	-	-	-	-	-
43417202	1,330	443	312	131	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43417203	658	219	154	65	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43417204	312	104	74	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43417301	-	-	-	-	1,988	772	421	201	72	-	-	5	102	194	33	48	141	-
43417302	1,932	644	454	190	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43417303	658	219	154	65	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43417304	503	167	117	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43417401	928	309	273	36	62	-	-	-	-	62	-	-	-	-	-	-	-	-

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TAZ	Population	Dwelling Units			Employment													
		Total	Single Family	Multi-Family	Total	Agriculture	Construction	Manufacturing	Wholesale	Retail	Transportation	Information	Finance Real Estate and	Professional	Education	Arts & Entertainment	Other Services	Public
43417402	225	75	66	9	1,568	-	-	-	-	1,568	-	-	-	-	-	-	-	-
43417403	225	75	66	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43417404	503	167	147	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43417405	658	219	193	26	960	60	17	93	-	94	-	210	45	197	123	32	93	-
43417406	-	-	-	-	1,269	36	123	133	-	51	-	333	92	156	183	31	133	-
43417407	-	-	-	-	1,232	60	127	73	-	84	-	386	95	213	93	32	73	-
43417408	347	124	-	-	1,327	236	123	31	-	131	-	500	92	123	31	31	31	-
43420101	1,257	354	214	140	644	3	92	17	13	159	49	18	44	120	41	49	38	-
43420102	1,257	354	214	140	644	3	92	17	13	159	49	18	44	120	41	49	38	-
43420201	327	104	56	48	1,029	3	209	220	101	146	5	1	9	92	128	26	13	76
43420202	327	104	56	48	1,029	3	209	220	101	146	5	1	9	92	128	26	13	76
43420203	327	104	56	48	1,029	3	209	220	101	146	5	1	9	92	128	26	13	76
43420204	327	104	56	48	1,029	3	209	220	101	146	5	1	9	92	128	26	13	76
43420205	327	104	56	48	1,029	3	209	220	101	146	5	1	9	92	128	26	13	76
43420301	924	300	176	124	607	5	122	20	16	80	23	6	33	140	76	44	42	-
43420302	612	195	114	81	607	5	122	20	16	80	23	6	33	140	76	44	42	-
43420303	612	195	114	81	607	5	122	20	16	80	23	6	33	140	76	44	42	-
43421101	489	221	162	59	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43421102	833	278	204	74	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43421103	2,023	674	493	181	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43421104	489	221	162	59	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43421105	938	371	273	98	1,007	37	152	41	26	-	22	1	71	212	79	84	283	-
43421106	1,679	618	453	165	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43421107	1,479	493	361	132	142	5	22	6	4	-	3	-	10	30	11	12	40	-
43421201	542	181	127	54	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43421202	56	19	13	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43421203	48	16	12	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43421204	988	325	229	96	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43421205	648	216	152	64	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43421206	289	96	67	29	142	5	22	6	4	-	3	-	10	30	11	12	40	-
43421301	211	70	50	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43421302	56	19	13	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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TAZ	Population	Dwelling Units			Employment													
		Total	Single Family	Multi-Family	Total	Agriculture	Construction	Manufacturing	Wholesale	Retail	Transportation	Information	Finance Real Estate and	Professional	Education	Arts & Entertainment	Other Services	Public
43421303	130	43	31	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43422101	990	330	309	21	9	-	2	-	-	-	-	-	1	2	-	-	1	3
43422102	268	89	84	5	1,030	7	28	4	24	573	2	-	4	25	6	8	8	342
43422103	282	94	89	5	264	-	-	-	-	264	-	-	-	-	-	-	-	-
43422104	-	-	-	-	264	-	-	-	-	264	-	-	-	-	-	-	-	-
43422201	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43422202	246	82	77	5	192	16	14	32	7	-	7	-	5	53	14	14	7	19
43422203	990	330	310	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43422204	899	300	282	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43422301	56	19	13	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43422302	408	136	66	70	24	-	-	-	-	24	-	-	-	-	-	-	-	-
43422303	581	194	136	58	24	-	-	-	-	24	-	-	-	-	-	-	-	-
43422304	581	194	136	58	24	-	-	-	-	24	-	-	-	-	-	-	-	-
43422305	1,117	372	262	110	24	-	-	-	-	24	-	-	-	-	-	-	-	-
43422306	1,191	397	280	117	39	-	-	-	-	39	-	-	-	-	-	-	-	-
43422307	1,191	397	280	117	39	-	-	-	-	39	-	-	-	-	-	-	-	-
43422308	1,705	568	399	169	30	-	1	-	-	24	-	-	-	4	-	-	-	1
43422401	761	254	237	17	1,762	-	-	-	-	1,762	-	-	-	-	-	-	-	-
43422402	581	194	181	13	24	-	-	-	-	24	-	-	-	-	-	-	-	-
43422403	581	194	181	13	24	-	-	-	-	24	-	-	-	-	-	-	-	-
43422404	82	27	25	2	424	21	212	43	-	64	-	-	-	43	21	-	21	-
43422405	82	27	25	2	424	21	212	43	-	64	-	-	-	43	21	-	21	-
43422501	78	26	18	8	9	-	2	-	-	-	-	-	1	2	-	-	1	3
43422502	246	82	57	25	18	2	-	5	1	-	1	-	-	6	2	2	-	-
43422503	33	11	8	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43422504	111	37	26	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43422505	662	221	153	68	24	-	-	-	-	24	-	-	-	-	-	-	-	-
43423101	275	74	24	50	9	-	2	-	-	1	-	-	4	1	1	-	-	-
43423102	40	11	3	8	1	1	-	-	-	-	-	-	-	-	-	-	-	-
43423103	40	11	3	8	1	1	-	-	-	-	-	-	-	-	-	-	-	-
43423104	79	21	6	15	3	1	1	-	-	-	-	-	1	-	-	-	-	-
43423105	79	21	6	15	3	1	1	-	-	-	-	-	1	-	-	-	-	-

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TAZ	Population	Dwelling Units			Employment													
		Total	Single Family	Multi-Family	Total	Agriculture	Construction	Manufacturing	Wholesale	Retail	Transportation	Information	Finance Real Estate and	Professional	Education	Arts & Entertainment	Other Services	Public
43423106	275	74	24	50	9	-	2	-	-	1	-	-	4	1	1	-	-	-
43423201	-	-	-	-	2,014	32	152	109	131	44	11	-	22	-	163	44	132	1,153
43423202	-	-	-	-	679	15	69	85	59	37	5	-	10	-	127	20	95	159
43423203	-	-	-	-	105	4	18	33	15	16	1	-	2	-	51	5	36	22
43423204	-	-	-	-	179	5	23	34	19	16	2	-	3	-	52	7	38	7
43423205	-	-	-	-	304	4	18	2	15	-	1	-	2	19	4	5	5	227
43423206	268	89	69	20	1,030	6	27	4	24	572	2	-	4	28	6	8	8	342
43423207	1,448	483	372	111	1,551	1	5	1	5	1,460	-	-	1	6	1	2	2	67
43423301	-	-	-	-	1,977	97	356	57	26	708	35	4	66	352	92	79	105	-
43423302	1,897	632	446	186	148	11	41	7	3	-	4	1	8	41	11	9	12	-
43423303	924	308	217	91	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43423304	1,342	447	314	133	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43423305	-	-	-	-	931	71	261	42	19	-	26	3	48	258	68	58	77	-
43423306	1,213	404	284	120	78	1	34	2	3	-	1	-	9	6	1	17	8	-
43423401	96	32	27	5	1,997	7	876	34	68	-	7	-	224	136	27	428	190	-
43423402	385	128	107	21	46	-	20	1	2	-	-	-	5	3	1	10	4	-
43423403	-	-	-	-	906	3	398	15	31	-	3	-	102	62	12	194	86	-
43423404	212	71	59	12	78	1	34	2	3	-	1	-	9	6	1	17	8	-
43423405	-	-	-	-	2,575	32	152	22	131	-	11	-	22	164	32	44	44	1,920
43423406	244	81	67	14	122	-	54	2	4	-	-	-	14	8	2	26	12	-
43423407	706	235	195	40	5	-	1	-	-	-	-	-	-	4	-	-	-	-
43423408	1,251	416	345	71	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43423501	1,275	323	31	292	14	-	-	-	-	8	-	-	5	-	-	-	-	1
43423502	80	20	2	18	1	-	-	-	-	1	-	-	-	-	-	-	-	-
43423503	159	41	4	37	2	-	-	-	-	1	-	-	1	-	-	-	-	-
43423504	80	20	2	18	1	-	-	-	-	1	-	-	-	-	-	-	-	-
43423601	86	30	18	11	521	5	113	153	32	179	54	18	41	57	393	135	141	41
43423602	4,417	1,550	204	1,346	239	1	25	14	7	30	12	5	9	27	58	30	12	9
43423701	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43423702	710	217	53	164	32	-	7	1	1	5	-	-	1	5	5	4	1	2
43433301	10	3	2	1	2,052	-	-	-	-	2,052	-	-	-	-	-	-	-	-
43433302	190	58	5	53	4	1	1	-	-	-	-	-	1	-	1	-	-	-

TAZ	Population	Dwelling Units			Employment													
		Total	Single Family	Multi-Family	Total	Agriculture	Construction	Manufacturing	Wholesale	Retail	Transportation	Information	Finance Real Estate and	Professional	Education	Arts & Entertainment	Other Services	Public
43433303	190	58	5	53	4	1	1	-	-	-	-	-	1	-	1	-	-	-
43433304	318	97	10	87	4	1	1	-	-	-	-	-	1	-	1	-	-	-
43433305	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43433306	63	19	2	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43433307	63	19	2	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43433308	63	19	2	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43433309	63	19	2	17	4	1	1	-	-	-	-	-	1	-	1	-	-	-
43433310	63	19	2	17	4	1	1	-	-	-	-	-	1	-	1	-	-	-
43433311	254	78	7	71	4	1	1	-	-	-	-	-	1	-	1	-	-	-

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APPENDIX D – AIR QUALITY SUMMARIES

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2016 Base Year

Internal-External VMT Summary

	Average Daily		
	Non-City	**Murrieta**	**Total VMT**
Non-City	N/A	1,898,990	**1,898,990**
Murrieta	1,818,561	419,106	**2,237,666**
Total VMT	**1,818,561**	**2,318,095**	**4,136,656**

VMT, VHT, VHD Summary

Total Vehicle Miles Traveled (VMT) by Facility Classification

Functional Classification	AM Peak Period 6 AM to 9 AM	Midday Period 9 AM to 3 PM	PM Peak Period 3 PM to 7 PM	Evening Period 7 PM to 9 PM	Nighttime Period 9 PM to 6 AM	Average Daily	Percent of Travel
Freeway	229,876	393,420	345,645	97,096	177,828	1,243,864	53.3%
HOV	0	0	0	0	0	0	0.0%
Expressway/Parkway	0	0	0	0	0	0	0.0%
Principal Arterial	9,099	17,720	13,654	4,938	8,328	53,740	2.3%
Minor Arterial	110,029	204,526	182,698	49,888	51,135	598,277	25.7%
Major Collector	65,275	104,286	108,615	25,462	26,072	329,711	14.1%
Minor Collector	7,075	13,037	14,309	3,038	2,987	40,445	1.7%
Ramp	11,825	21,963	19,004	5,855	7,355	66,003	2.8%
Trucks Only	0	0	0	0	0	0	0.0%
Total	**433,179**	**754,953**	**683,925**	**186,277**	**273,706**	**2,332,041**	**100.0%**

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VMT by Speed Bin

Vehicle Miles Traveled

Speed Ranges	AM Peak Period 6 AM to 9 AM	Midday Period 9 AM to 3 PM	PM Peak Period 3 PM to 7 PM	Evening Period 7 PM to 9 PM	Nighttime Period 9 PM to 6 AM	Average Daily	Percent of Travel
0 - 5 mph	125	0	0	0	0	125	0.0%
5 - 10 mph	231	472	2,321	0	0	3,023	0.1%
10 - 15 mph	3,723	2,388	5,217	400	0	11,728	0.5%
15 - 20 mph	8,225	2,346	10,856	557	47	22,030	0.9%
20 - 25 mph	11,888	8,858	26,556	1,331	999	49,633	2.1%
25 - 30 mph	23,542	28,042	59,437	5,859	4,459	121,339	5.2%
30 - 35 mph	51,511	71,511	93,600	14,422	17,195	248,240	10.6%
35 - 40 mph	86,466	186,555	178,209	45,391	45,075	541,696	23.2%
40 - 45 mph	77,467	66,654	70,601	18,254	21,148	254,122	10.9%
45 - 50 mph	34,147	130,951	47,103	5,331	6,956	224,488	9.6%
50 - 55 mph	29,423	40,830	5,470	42,967	75,595	194,285	8.3%
55 - 60 mph	32,067	0	95,839	0	0	127,906	5.5%
60 - 65 mph	12,913	0	25,018	0	0	37,932	1.6%
65 - 70 mph	30,537	125,592	33,970	0	0	190,100	8.2%
70 - 75 mph	30,914	90,754	29,728	51,765	102,232	305,393	13.1%
75 - 80 mph	0	0	0	0	0	0	0.0%
VMT - Total	**433,179**	**754,953**	**683,925**	**186,277**	**273,706**	**2,332,041**	**100.0%**

*Note: Travel statistics do not include travel on centroids or local roads w hich are not included in the model.

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2040 Forecast Year

Internal-External VMT Summary

	Average Daily		
	Non-City	**Murrieta**	**Total VMT**
Non-City	N/A	2,390,687	**2,390,687**
Murrieta	2,406,821	1,071,423	**3,478,244**
Total VMT	**2,406,821**	**3,462,110**	**5,868,932**

VMT, VHT, VHD Summary

Total Vehicle Miles Traveled (VMT) by Facility Classification

Functional Classification	AM Peak Period 6 AM to 9 AM	Midday Period 9 AM to 3 PM	PM Peak Period 3 PM to 7 PM	Evening Period 7 PM to 9 PM	Nighttime Period 9 PM to 6 AM	Average Daily	Percent of Travel
Freeway	296,905	564,754	473,562	143,326	285,130	1,763,677	46.1%
HOV	0	0	0	0	0	0	0.0%
Expressway/Parkway	60,207	125,544	96,747	30,882	36,584	349,965	9.1%
Principal Arterial	92,448	189,796	156,664	43,278	47,343	529,528	13.8%
Minor Arterial	152,927	288,083	273,953	61,951	60,686	837,600	21.9%
Major Collector	6,069	11,262	10,426	2,268	3,364	33,388	0.9%
Minor Collector	26,584	47,386	52,840	10,536	11,128	148,474	3.9%
Ramp	30,891	57,871	46,550	12,547	15,730	163,590	4.3%
Trucks Only	0	0	0	0	0	0	0.0%
Total	**666,032**	**1,284,696**	**1,110,743**	**304,788**	**459,965**	**3,826,223**	**100.0%**

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VMT by Speed Bin

Vehicle Miles Traveled

Speed Ranges	AM Peak Period 6 AM to 9 AM	Midday Period 9 AM to 3 PM	PM Peak Period 3 PM to 7 PM	Evening Period 7 PM to 9 PM	Nighttime Period 9 PM to 6 AM	Average Daily	Percent of Travel
0 - 5 mph	0	0	0	0	0	0	0.0%
5 - 10 mph	2,024	1,682	9,452	56	0	13,215	0.3%
10 - 15 mph	4,430	9,821	8,617	592	0	23,459	0.6%
15 - 20 mph	12,913	17,474	32,207	695	393	63,682	1.7%
20 - 25 mph	23,847	17,292	54,562	3,488	1,071	100,261	2.6%
25 - 30 mph	63,369	100,297	126,460	14,336	16,810	321,272	8.4%
30 - 35 mph	80,166	163,204	191,269	25,241	13,408	473,289	12.4%
35 - 40 mph	120,448	239,068	220,920	62,000	75,377	717,812	18.8%
40 - 45 mph	60,852	122,275	79,618	39,612	39,603	341,960	8.9%
45 - 50 mph	48,078	25,096	90,619	9,703	20,890	194,386	5.1%
50 - 55 mph	67,792	44,164	123,845	5,739	7,283	248,824	6.5%
55 - 60 mph	41,260	157,737	45,347	0	0	244,344	6.4%
60 - 65 mph	49,380	211,397	90,629	13,828	0	365,233	9.5%
65 - 70 mph	67,544	148,451	30,281	69,886	84,936	401,098	10.5%
70 - 75 mph	23,927	26,738	6,917	59,612	200,193	317,388	8.3%
75 - 80 mph	0	0	0	0	0	0	0.0%
VMT - Total	**666,032**	**1,284,696**	**1,110,743**	**304,788**	**459,965**	**3,826,223**	**100.0%**

*Note: Travel statistics do not include travel on centroids or local roads w hich are not included in the model.

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APPENDIX E – "WITH PROJECT" TRAFFIC MODELING APPROACH

DRAFT

iteris®

213.488.0345
iteris.com

801 South Grand Avenue, Suite 530
Los Angeles, CA 90017

MEMORANDUM

To: City of Murrieta	**From:** Iteris, Inc. (on behalf of Rick Engineering Company)

Date: June 10, 2019

RE: **DRAFT -** Murrieta Focused General Plan Update – "With Project" Traffic Modeling Approach

The purpose of this memorandum is to describe Iteris' approach to developing the "With Project" modeling utilizing the Murrieta traffic model. It is intended to supplement the Traffic Impact Study and Climate Action Plan for the Focused General Plan Update.

2040 With Project

Utilizing the information provided as part of the Project Description, Iteris converted land use to Socio-Economic Data (SED) such as jobs, households, and population, for use within the model. SED was added and subtracted as necessary from the SED included in the currently adopted General Plan scenario, in 2040, within the affected Transportation Analysis Zones (TAZ).

Existing Plus Project

Under existing conditions, the SED within the affected TAZs is based on "ground conditions". As a result, SED quantities in some TAZs are not large enough to allow for applying the project-related reductions (in jobs, for example). Thus, Iteris applied professional judgement to reduce SED accordingly, and all of the additions to SED were made in full.

For example, if the With Project scenario details a reduction of 434 households and the existing scenario only has 270 households, then the Existing Plus Project scenario will reduce the available households by 270 households, but not the full 434 households.

1700 Carnegie Avenue, Suite 100
Santa Ana, CA 92705

iteris.com

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APPENDIX G
DRAFT MEMORANDUM VEHICLE MILES TRAVELS (VMT) ANALYSIS

MEMORANDUM

TO: Jarrett Ramaiya, City of Murrieta

FROM: Erik Ruehr, VRPA Technologies, Inc.

DATE: August 16, 2019

RE: Murrieta General Plan Update – Vehicle Miles Traveled (VMT) Analysis

VRPA Technologies (VRPA) has reviewed the VMT results from the transportation model prepared for the Murrieta General Plan Update and we believe that revisions are needed in the calculations in order to obtain accurate VMT results for the Adopted General Plan scenario and the Proposed General Plan Update scenario. Although the transportation model was prepared using typical modeling procedures, we believe that the model was not able to accurately account for the following situations that are important in the VMT analysis:

- In the Adopted General Plan scenario, the model assumes buildout of Office and Research Park and Business Park land uses. In reality, it is doubtful that buildout of these land uses could occur given market conditions. In fact, of the underlying considerations in the General Plan update was the need to better balance employment land use with the market for development of employment-related facilities.

- In the Proposed General Plan Update scenario, there are plans for development of an employment-related innovation center and associated residential units that will be oriented toward employees of the innovation center. The transportation model does not have a way to accurately model the transportation characteristics of these units.

This memo provides proposed revisions to the VMT analysis calculations to account for these two conditions.

ADJUSTMENT FOR EMPLOYMENT-RELATED LAND USES

Due to the high numbers of residents of southern Riverside County who commute to other counties, each employee added in Murrieta reduces VMT as residents of southern Riverside County who formerly commuted long distances now have the opportunity to be employed closer to where they live. As described above, the Adopted General Plan scenario assumed more employees in Murrieta than would actually occur due to market conditions. The proposed revision to the VMT analysis to account for this change is to calculate the increase in VMT that would occur if fewer employees were located in Murrieta. The first step is to calculate the number of employees assumed in the model that would not actually be

located in Murrieta. This value is called "excess employees" in the calculation. The proposed calculation is as follows:

Increase in Daily VMT = Excess Employees x Average Daily Trips per Employee x (Average Trip Length to External County Job Location – Average Trip Length to Murrieta Job Location)

ADJUSTMENT FOR RESIDENTIAL UNITS ORIENTED TOWARD INNOVATION CENTER

In the Proposed General Plan Update, residential units are proposed to be oriented toward an employment area known as the Innovation Center. The residential units would be located in close proximity to job opportunities and trips would be expected to be made by walking, bicycling, or short vehicle trips. From the transportation model's point of view, the residential units oriented toward the Innovation Center would be treated as typical residential units in Murrieta with a typical commute distance for a resident commuting to a job in an external County. The proposed VMT adjustment to take this into account would be to determine the increase in VMT that would occur if these residential units were oriented toward a typical employment location. The proposed calculation is as follows:

Increase in Daily VMT = Residential Units Oriented Toward Innovation Center x Average Daily Employment Trips per Unit x (Average Trip Length to External County Job Location – Average Trip Length to Innovation Center)

KEY PARAMETERS

In order to complete the calculations proposed above, certain key parameters need to be determined. They include the following:

Excess Employees in Adopted General Plan Scenario: 7,258

Average Daily Trips Per Employee: 2.0

Average Trip Length From Murrieta to External County Jobs: 55.0

Average Trip Length To Southern Riverside County Job Locations: 5.0

Residential Units Oriented Toward Innovation Center: 1,796

Average Daily Employment Trips Per Unit: 2.0

Average Trip Length to Southern Riverside County Employment Location: 5.0

Average Trip Length to Innovation Center: 1.0

CALCULATIONS AND RESULTS

Given the adjustment calculations and key parameters described above, the following methodology was used to determine VMT results for the 2035 General Plan Update:

- VMT results were calculated for 2040 conditions, based on the VMT results produced by the regional transportation model, which has a horizon year of 2040.

- VMT results were calculated for base year 2016 using the regional transportation model's base year scenario.

- VMT results were calculated for intervening years (2020, 2030, and 2035) using linear interpolation of the results for 2016 and 2040.

Unadjusted VMT results obtained from the regional transportation model are shown below:

Daily Base Year (2016) VMT – Adopted General Plan: 4,136,700

Daily Base Year (2016) VMT – Proposed General Plan Update: 4,132,649

Daily 2035 VMT – Adopted General Plan: 4,956,788

Daily 2035 Proposed General Plan Update: 5,868,181

Use of equations and key parameters identified above leads to the following results:

Increase in Daily 2035 VMT in Adopted General Plan Scenario: 623,046

Decrease in Daily 2035 VMT in Proposed General Plan Update Scenario: 11,375

Total Daily 2035 VMT in Adopted General Plan Scenario: 5,588,834

Daily 2035 VMT/Capita in Adopted General Plan Scenario: 43.2

Total Daily 2035 VMT in Proposed General Plan Update Scenario: 5,495,806

Daily 2035 VMT/Capita in Proposed General Plan Update Scenario: 41.1

The VMT results by scenario and horizon year are provided in Exhibit 1. Exhibit 2 shows the socio-economic data from the transportation modeling process that were used in the VMT analysis.

Please feel free to contact me with any comments or questions by email at eruehr@vrpatechnologies.com or by phone at 858/361-7151.

Exhibit 1

Total Citywide Vehicle Miles Traveled (VMT)

Analysis Year	Scenario		
	Existing (Adopted) General Plan	Proposed General Plan Update	Net Change
2016 (Base)	4,136,700	4,132,649	-4,051
2020	4,442,413	4,419,630	-22,783
2030	5,206,697	5,137,080	-69,617
2035 (General Plan Update Horizon Year)	5,588,834	5,495,806	-93,028
2040 (Regional Transportation Model Horizon Year)	5,970,980	5,854,532	-116,448

Note: VMT totals calculated using origin-destination method

Exhibit 2

Total Citywide Socio-Economic Data (SED) Summary*

Analysis Year	Scenario								
	Existing (Adopted) General Plan			Proposed General Plan Update			Net Change		
	Households	Population	Employment	Households	Population	Employment	Households	Population	Employment
2016 (Base)	33,796	106,185	27,735	35,534	110,897	28,628	1,738	4,712	893
2020	35,631	111,057	38,951	37,341	115,718	39,205	1,710	4,661	254
2030	40,218	123,238	66,990	41,859	127,772	65,646	1,641	4,534	-1,344
2035 (General Plan Update Horizon Year)	42,511	129,329	81,009	44,118	133,798	78,866	1,607	4,470	-2,143
2040 (Regional Transportation Model Horizon Year)	44,805	135,419	95,029	46,377	139,825	92,087	1,572	4,406	-2,942

* As described in this memo, the Adopted General Plan scenario assumed more employees in Murrieta than would actually occur due to market conditions.
See text in the memo for comments regarding employment data adjustments for Existing (Adopted) General Plan scenario.

APPENDIX H
DRAFT MURRIETA GENERAL PLAN 2035

the future of southern california

Murrieta

General Plan Update

DRAFT

Murrieta General Plan 2035

CITY COUNCIL

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Scott Vinton, *Mayor Pro-Tem*
Jonathan Ingram, *Councilmember*
Kelly Seyarto, *Councilmember*
Christi White, *Councilmember*

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Jon Levell, *Vice Chair*
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TRAFFIC COMMISSION

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Cindy Warren, *Vice Chair*
Brian Barton, *Commissioner*
Keelan McCullough, *Commissioner*
Peter Thorwarth, *Commissioner*

CITY MANAGER

Kim Summers, *City Manager*
Ivan Holler, *Assistant City Manager*

DEVELOPMENT SERVICES DEPARTMENT

Ivan Holler, *Assistant City Manager/Acting Director*
Jarrett Ramaiya, *Planning Division*, *City Planner*
Carl Stiehl, *Senior Planner*
Lorie Abeles, *Executive Assistant*

CITY STAFF

Bob Moehling, *Director of Public Works/City Engineer*
Stacey Stevenson, *Director of Administrative Services*
Javier Carcamo, *Finance Manager*
Deona Knight, *Human Resources Manager*
Gino Jimenez, *Building Official*
Scott Agajanian, *Economic Development Deputy Director*
Stephanie D. Smith, MMC, *City Clerk*
Brian Ambrose, *Senior Program Manager*
Lea Kolek, *Parks & Recreation Manager*

Alex Anderson, *IS Manager*
John Anisko, *GIS Technician*
David Lantzer, *Fire Chief*
Chris Jensen, *Fire Marshal*
Sean Hadden, *Chief of Police*
Tony Conrad, *Police Department Captain*
Brian Stephenson, *Contract Traffic Engineer*
Rick Engineering Company
Barry Schultz, *Assistant City Attorney*
Devaney Pate Morris & Cameron, LLP

Element Adoption Dates

Land Use Element
TBD

Economic Development Element
TBD

Circulation Element
TBD

Infrastructure Element
TBD

Healthy Community Element
TBD

Conservation Element
TBD

Recreation and Open Space Element
TBD

Air Quality Element
TBD

Noise Element
TBD

Safety Element
TBD

Housing Element
TBD

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Chapter 1
Introduction

1.1 OVERVIEW

The Murrieta General Plan is a document required by California law that provides a foundation for City policies and actions. It guides both the physical development of Murrieta and the provision of public infrastructure and services.

This General Plan places particular emphasis on economic development and keeps Murrieta in front of current policy topics, including sustainability and health. It is rooted in ten community priorities that were developed through an extensive community involvement process.

1.2 ABOUT THE GENERAL PLAN

GENERAL PLAN TOPICS

California law requires each city and county to have an adopted General Plan. State law specifies that each jurisdiction's General Plan address seven "elements," or topics: land use, circulation, housing, conservation, open space, noise, and safety. Cities are also allowed to include additional elements on matters of particular importance within that community.

The Murrieta General Plan includes the following chapters:

- **Introduction:** Purpose and contents of the General Plan, its relationship to California law, background on Murrieta, the planning process that was followed for the General Plan Update, and the community priorities that shaped the General Plan goals and policies.

- **Vision:** Context for the General Plan, including major policy initiatives behind the General Plan Update.

- **Land Use Element:** Growth, development, redevelopment, conservation, and preservation. Parameters and desired locations for land uses such as residential, commercial, industrial, civic/institutional, parks, and open space are mapped and described.

- **Economic Development Element:** Strength and diversity of the economy, jobs, retail, and revenue for public services.

- **Circulation Element:** Transportation systems within the City that provide for automobile, truck, transit, bicycle, and pedestrian movement.
- **Conservation Element:** Biological resources, cultural resources, energy resources, solid waste reduction, sustainable development, and green building.
- **Recreation and Open Space Element:** Open space and recreation opportunities including natural open spaces, linear open space, trails, and public and private recreation facilities.
- **Air Quality Element:** Air pollution and greenhouse gases.
- **Noise Element:** Noise from various sources, including transportation corridors and commercial areas.
- **Infrastructure Element:** Facilities for water, wastewater, flood control, and drainage.
- **Safety Element:** Natural and manmade hazards including seismic hazards, flood potential, hazardous materials incidents, fire hazards, transportation hazards and crime.
- **Healthy Community Element:** Ensuring a healthy community by addressing such topics as pedestrian and bicycle safety, access to nutritional foods, mental health, physical activity and environmental justice.
- **Housing Element:** The Housing Element was updated in a separate process but is part of the updated General Plan. It addresses local and regional needs for housing.

USE AND PURPOSE OF THE GENERAL PLAN

The role of each community's General Plan is to act as a constitution for development and the foundation upon which all land use decisions are to be based. Land use decisions encompass not only zoning, but also circulation, infrastructure, design, open space, and other factors. The Murrieta General Plan is a policy document to assist and guide local decision-makers. The General Plan also identifies land uses and their distribution throughout the City. To be considered consistent with the General Plan, a project must not only be consistent with the Land Use Plan, but it must also further the goals of all elements of the General Plan and must meet the intent of its goals and policies.

The General Plan is to be used by the City Council to make funding and budget recommendations and decisions. City Staff will use the General Plan to regulate building and development and to make recommendations on projects to the Planning Commission and City Council. The General Plan will also be used by residents, neighborhood groups, City Council and Commissions, and developers to understand the City's long-range plans, to evaluate land use changes, and to evaluate specific development proposals.

A General Plan is a legal document that must meet specific State requirements for content. The Murrieta General Plan meets or exceeds the requirements set forth in the *California Government Code* Section 65300 et seq. The General Plan is an integrated, internally consistent statement of the official land use policy for the City of Murrieta. The Plan addresses each issue prescribed by State law as it applies to Murrieta. The Plan contains land use and circulation maps. It also contains text that identifies goals, sets forth policies, and identifies implementation strategies.

The *California Environmental Quality Act* (*CEQA*) requires all local and State governmental agencies to consider the environmental consequences of projects over which they have a discretionary authority. CEQA Statutes (*Public Resources Code* Section 21065) define a project as "an activity which may cause either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment." Therefore, the City of Murrieta, as the lead agency, was required to prepare and certify an Environmental Impact Report (EIR) for the General Plan Update.

The General Plan EIR is a public document that assesses the overall environmental effects of the Plan update at a program level of detail and indicates ways to reduce or avoid possible environmental damage. The Program EIR generally analyzes the broad environmental effects of the General Plan Update, and provides a baseline, or "first tier," against which future projects implemented under the General Plan 2035 horizon will be evaluated. Where subsequent *CEQA* documentation is required for a future project, the City must implement the applicable mitigation measures developed in the Program EIR, and focus its analysis on site-specific issues that cannot otherwise be addressed at a program or policy level of analysis.

The Program EIR is to be used as a companion document with the General Plan.

ADMINISTERING THE GENERAL PLAN

It is the intent of the City Council to implement this General Plan by establishing planning goals and policies based on the Plan, developing ordinances and regulations to implement the Plan, and providing the requisite staff resources. The City Council is also aware that its intention to implement this General Plan is based on the availability of funding and that some goals, policies, and programs may take longer to achieve if funds are unavailable.

Once adopted, the General Plan does not remain static. As time goes on, the City may determine that it is necessary to revise portions of the text, amend the land use map, or add policies or programs to reflect changing circumstances or philosophy.

State law provides direction on how cities can maintain the General Plan as a contemporary policy guide: it requires each planning department to report annually to the City Council on "the status of the plan and progress in its implementation" (*Government Code* Section 65400[b]). The City Council may respond to the Development Services Department review by setting goals for the coming year.

AMENDING THE GENERAL PLAN

It is necessary to periodically review, update, and revise the General Plan. State law permits General Plan amendments up to four times per year for each mandatory element (*Government Code* Section 65358[b]). Optional elements are permitted by State law (*Government Code* Section 65303), and once adopted, the optional elements carry the same legal weight as the seven mandated elements.

1.3 ABOUT MURRIETA

SETTING

The City of Murrieta is located in southwestern Riverside County, between the Santa Ana Mountains and San Jacinto Mountains, where the I-15 and I-215 Freeways meet. This scenic area with creeks, hot springs, and rolling hills has been the site of various settlements dating back to prehistoric times, and Murrieta's downtown reflects the history of the town site that was established in 1884. Incorporated in 1991 with a population of approximately 24,000, Murrieta is now home to over 100,000 people.

Surrounding communities include Menifee, Temecula, Wildomar, and unincorporated Riverside County; refer to *Exhibit 1-1*, *Regional Location Map*. The San Diego County border is just south of Temecula, and Orange County lies on the other side of the Santa Ana Mountains to the west.

Murrieta's "crossroads" location has made it possible for many people to live here and enjoy affordable housing, excellent schools, and "small town feeling" lifestyle while commuting to jobs elsewhere. Originally founded as a stop along the California Southern Railway, the City looks forward to an extension of the Metrolink commuter line from Corona or Perris into southwest Riverside County, and to a potential station for California's High Speed Rail that has been proposed in the vicinity of the I-15/I-215 junction.

LANDSCAPE

The City's Corporate Boundary and Sphere of Influence comprises 41.96 square miles, of which 33.61 square miles is located within the City Limits. The average elevation within the City is approximately 1,110 feet above mean sea level (AMSL).

Murrieta sits below the Santa Rosa Plateau of the Santa Ana Mountains. The Hogbacks Ridge runs through the northeastern part of the City. Other mountain ranges are visible in the distance: the San Jacinto Mountains to the east, and the Santa Margarita and Agua Tibia ranges to the south.

The two main creeks and their tributaries flowing through Murrieta are Murrieta Creek in the western portion and Warm Springs Creek to the east. Open space lines these waterways. Murrieta Hot Springs Road got its name from mineral-rich springs that once attracted travelers who sought their healing properties.

For most of the twentieth century, Murrieta was most notable for dry farming and producing grain and other agricultural products. In the 1960s, the area was known for the breeding of fine racehorses. This heritage is still reflected in the large-lot rural areas near the base of the Santa Ana Mountains and along Los Alamos Road, and in the remaining agricultural land.

By 2009, approximately one-third of the land within Murrieta's City limits was developed with residential uses. Commercial centers and business parks are located along the freeways and major streets, while industrial uses are found in the South Murrieta Business Corridor and west side of the City. Murrieta is still growing, with just over one-third of the land considered to be vacant.

HISTORY

Paleo-Indian Period. Archaeological research and tribal oral traditions in the Murrieta-Temecula area suggests that prehistoric occupation of the valley dates back thousands of years. There are a number of long-term village complexes and habitation sites located in Murrieta, which are valuable resources. The remnants of early villages as well as the local art and ethnographic accounts provide an important record of Murrieta's early occupation by Native Americans.[1]

Late Period. It is generally assumed that the Late Period began approximately AD 500 to 750, and its termination is widely accepted as AD 1769, the date of the beginning of permanent European occupation of California. The Luiseno Peoples occupied the Murrieta-Temecula area and called themselves Payomkawichum before the influx of European settlers and the Mission Period. There are also many Luiseno place names within the Murrieta area. Several village complexes were located within the City's boundaries; one that has been definitively identified by the Tribe is Qengva, which is in the southwest part of Murrieta. To the north of Qengva is 'avaa'ax, referring to the cottonwood trees along Murrieta Creek. To the east is the "The Owls' Nest" or Muula Putee, which is located on what residents know as the Hogbacks in the Los Alamos area. Flowing beside these prominent hills to the south is the Santa Gertrudis River or Totpa, a very important water source.[2]

Spanish and Mexican Periods. Both the San Luis Rey and the San Juan Capistrano Missions claimed the territory for cattle raising and used local vaqueros to manage their cattle herds. They likely used Los Alamos Road to travel from the Alamos grasslands to the missions. Soon after Spain lost control of Mexico and the missions closed, the entire Murrieta area was divided among three land grants: Rancho Temecula, San Jacinto Rancho, and Rancho Santa Rosa.[3]

American Period. As travel along the Santa Fe Trail and Southern Emigrant trails during the early American Period brought more settlers, settlement occurred along the Santa Ana and San Jacinto waterways. The Southern Pacific Railroad line from Los Angeles through the San Gorgonio Pass was completed in 1876. In 1883, the California Southern Railway allowed for

[1] City of Murrieta *General Plan*, June 21, 1994.

[2] Ibid.

[3] Ibid.

travel through the Cajon Pass and down to San Diego through what is now western Riverside County.

By the late 1880s and early 1890s, there was growing discontent between Riverside and San Bernardino, its neighbor 10 miles to the north. After a series of instances in which charges were claimed about unfair use of tax monies to the benefit of the City of San Bernardino only, several people from Riverside decided to investigate the possibility of a new county. Joined by San Diego County residents in the Temecula and San Jacinto Valleys and the desert region who were tired of living so far from their county seat, they petitioned the State legislature, held an election, and on May 9, 1893 formed Riverside County.

Further developments in Riverside County included Banning and Beaumont in the San Gorgonio Pass; Hemet south of San Jacinto; Moreno Valley east of Riverside; Perris, Lake Elsinore, Murrieta and Temecula along the California Southern Railroad; Palm Springs, Palm Desert, Indio and Coachella along the Southern Pacific route to Yuma; and Blythe on the Colorado River. The trains were used to transport settlers into the area, creating a period of agricultural and land development. Transportation, agriculture, and the control of water have continued to be central themes in the settlement, development, and growth of Riverside County.[4]

The Murrieta area was originally included in Mission San Luis Rey's lands as part of Rancho Temecula. After secularization, other ranchos were carved from Rancho Temecula, including the Pauba, La Laguna, and Little Temecula Ranchos. By the mid-19th century, Murrieta's land area was bisected by the Southern Emigrant Trail, which ran through western Riverside County in a similar alignment to the current I-15 Freeway. The trail, which also served as the route of the Butterfield Overland Stage, went through a major stop called "Alamos," the Spanish word for cottonwoods, located near the present-day intersection of Cherry and Jefferson Avenues in Murrieta. Another branch of the Southern Emigrant Trail veered northward from Temecula to Box Springs near present-day Moreno Valley, roughly following the present-day route of I-215 Freeway.[5]

The City of Murrieta was named after Don Juan Murrieta, a Spaniard who originally settled in the Merced region of the San Joaquin Valley. Don Juan Murrieta eventually drove his herds of sheep southward to southern California, and after bringing 100,000 sheep to southwestern Riverside County (along with several business partners), purchased 52,000 acres of the Temecula and Pauba ranchos from Vincent de Laveaga of San Francisco in 1873. Juan and his brother Ezekiel Murrieta deeded a right-of-way to the California Southern Railway in 1882 and soon thereafter announced their plans to subdivide a town called "Murrietaville" along the railroad.[6,7]

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[4] Robinson, W.W. 1979. *Land in California*. Berkeley and Los Angeles: University of California Press.

[5] Lech, Steve. 2004. *Along Old Roads. A History of the Portion of Southern California that Became Riverside County, 1772–1893*. Published by the Author.

[6] Garrison, Arlean V. 1963. *My Children's Home—A History of Murrieta, California*. Published by the author.

[7] Ibid 4.

In 1884, before they could make their plans a reality, the Murrieta brothers were bought out by the Temecula Land and Water Company, which immediately subdivided a portion of its new holdings. The subdivided lands included 14,500 lots that were generally 40 acres in size, as well as some larger tracts ranging from 200 to 4,000 acres each for large-scale agriculture.[8] At the heart of the subdivision was the Murrieta town site, which consisted of 160 acres divided into 537 lots near the railroad depot. The original grid layout of streets included Kalmia, Juniper, and Ivy Streets which ran northeast to southwest; and Washington, Clay, and Hayes Streets, which ran northwest to southeast. The town increased rapidly during the boom years that affected many railroad-adjacent towns in southern California in the late 1880s.[9]

By 1886, the town included a post office, depot, large hotel, restaurant, two general stores, a hardware and furniture store, school, livery stable, lumber yard, butcher shop, laundry, blacksmith shop, church, newspaper called *The Era*, and two physicians. By 1890, the town had a population of 800.[10] When Riverside County was formed in 1893, Murrieta was designated one of 12 original judicial townships and the 40th election precinct.[11]

Washington Avenue, 1917. Credit: E. Hale Curran Collection.

[8] Ibid 6.

[9] Ibid 5.

[10] Ibid 6.

[11] Gunther, Jane Davies. 1984. *Riverside County, California, Place Names: Their Origins and Their Stories*. Rubidoux Printing Co., Riverside, California.

Washington Avenue, 1917. From left to right, H.C. Thompson, A.K. Small, Dr. Sturgis, and Harry Thompson.
This building still stands, although the façade has changed over the years. Credit: E. Hale Curran Collection.

The Santa Fe Railroad acquired California Southern Railway after a wet winter in 1883–1884 ruined a large stretch of their newly-created railway through the Temecula Valley. The connection was reconstructed; however, their purchase was not financially profitable. After they completed a line through the San Jacinto Valley, the California Southern alignment became somewhat redundant as well. In 1891, after a wet winter flooded and washed out the California Southern tracks in Temecula Valley, Santa Fe drastically curtailed rail service through Murrieta. Murrieta became the end of a rail spur from Corona and not a stop along any major thoroughfare.[12] This, in addition to the broader southern California real-estate bust in the 1890s, dampened Murrieta's growth as a town. After a short-lived attempt in the 1890s to attract "gentleman planters" to the area with an irrigation district aimed at supporting widespread groves of deciduous fruits, the area settled into a more bucolic existence.[13] Daily train service continued into Murrieta until 1935, after automobile use had become a well-established alternative to train travel in southern California.[14]

[12] Ibid.

[13] Ibid 5.

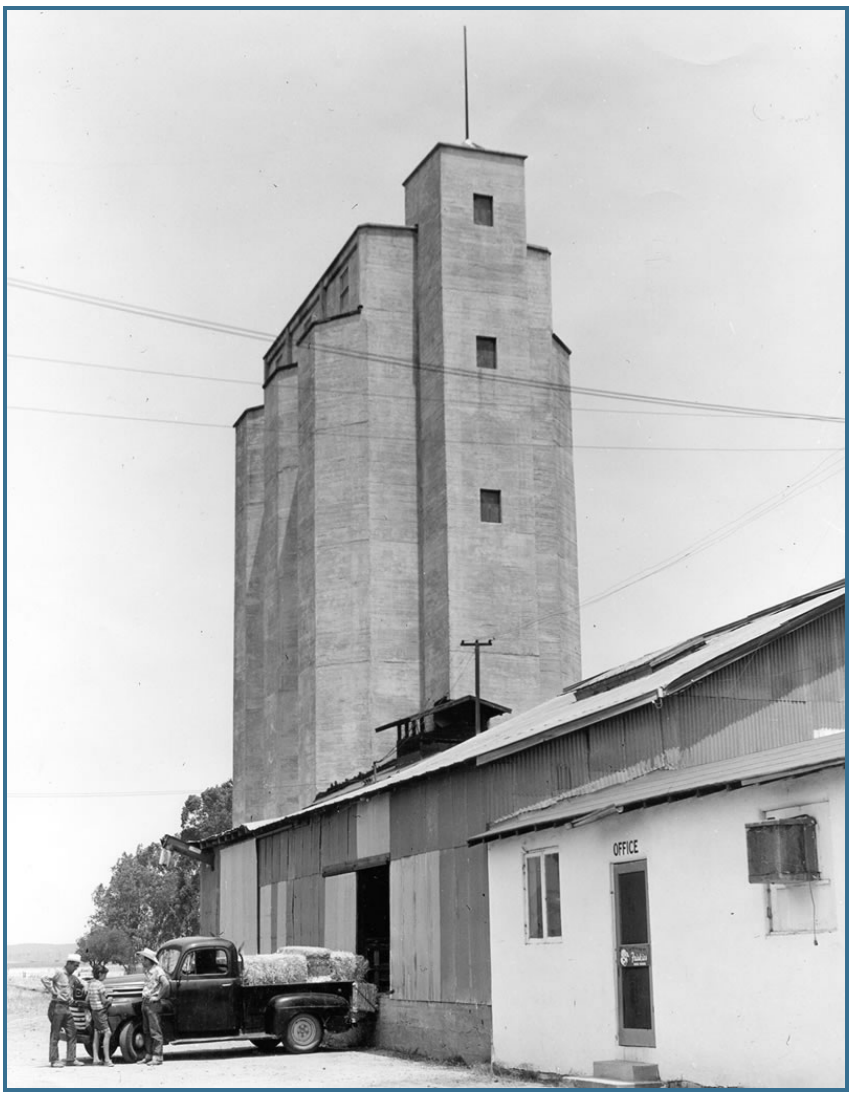
[14] Ibid 6.

Murrieta Depot, 1898. Standing in front are Depot Agent O.W. Miller and his daughter Evelyn. Credit: E. Hale Curran Collection.

After the close of the rail line in 1935, the land boom ended. By 1947, the town had an estimated population of 1,200. In that same year, the Murrieta Fire Protection District was formed. Civic accomplishments in the 1950s included a new town hall (1956) and the formation of the Murrieta Valley Chamber of Commerce (1959). In the 1960s, the area became known for the breeding of fine racehorses.

From the 1890s through the late 20th century, Murrieta's land use and local economy was largely based on dry-farming grains (barley, wheat, and oats), and Murrieta's identity was influenced by established farms of vast rolling fields of seasonal grasses. Murrieta was largely a town consisting of grain farmers who drove huge teams of horses pulling combine harvesters over the fields of the Antelope Valley, the Santa Rosa Plateau, and the Alamos district. Murrieta farmers also grew potatoes, alfalfa, vegetables, and grape vineyards, as well as orchards of olive, cherry, pear, apple, fig, and nectarine trees.[15]

[15] Alter, Ruth C., Kathleen A. Crawford, and Scott A. Moomjian. 2004. Murrieta Historical Resources Inventory Update. Prepared for the City of Murrieta by Archaeos, May 2004.



Built in 1918, the grain elevator is pictured here in 1958. It was operating until 1983 and still stands, west of downtown. Credit: E. Hale Curran Collection.

One exception to the community's dominant agricultural identity was the regionally-popular Murrieta Hot Springs. Located along present Murrieta Hot Springs Road just east of I-215, the mineral-rich springs have been used by people for thousands of years. The Luiseño called the springs Cherukanukna Hakiwuna and their extensive use of the springs is reflected in the numerous habitation sites and artifacts identified nearby. Visitors in the late 19th century determined that the springs had healing properties, and Murrieta Hot Springs became part of a rapidly growing network of Southern California destinations for health-seekers. In 1887, a Pasadena syndicate bought the hot springs, along with over a thousand acres of land. After several years of new owners, Murrieta Hot Springs was purchased by Fritz Guenther in 1902. It prospered under the family's ownership for nearly 70 years, expanding from 200 acres of ranch

land and a few decrepit buildings into over 500 acres of prime resort spa, complete with bathhouses, tiled pools, hotels, great halls, stables, gardens, and hiking trails; however, by 1969, profits declined due to laws prohibiting gambling, and affordable air travel enticed families to take their vacations elsewhere. Murrieta Hot Springs was sold again, continuing its decline over the years until the spa was closed in 1990 and the resort was auctioned off.[16] Since that time, the Murrieta Hot Springs have been acquired by the Calvary Chapel Bible College, who has been restoring many of the buildings to their former glory.

City Incorporation. Renewed residential growth in Murrieta began in the 1980s with the improvement of I-15 and I-215 Freeways and subsequent migration of thousands of San Diego and Orange County residents' farther inland in search of affordable suburban housing. The 1980 Census recorded approximately 2,200 residents in Murrieta; however, by 1990, the population had soared to over 24,000 residents. This rapid residential growth between 1980 and 1990 led Murrieta to incorporate as a general law City in 1991.

Following incorporation, Murrieta started its own police department and took control of the 46-year-old Fire Protection District. The first Murrieta General Plan was adopted in 1994. The City of Murrieta established its own public library in 1998 and built a larger facility for it in 2007 in Town Square, a 34-acre site on the edge of downtown where Murrieta's City Hall, Police Department, Fire Department, Senior Center, and Library encircle a town green and amphitheater. The first building completed in Town Square was the Police Department, in 2002. Murrieta's first park intended to serve the entire City soon started taking shape, with the first phase of Los Alamos Hills Sports Park completed in 2006.

Murrieta's residential growth continued to increase the population, to approximately 44,280 people in 2000 and 85,000 in 2005. As of 2009, the City's population is estimated to be 100,714.[17]

PEOPLE

As described above, the City of Murrieta's total population has approximately quadrupled in size since its incorporation, from 24,334 in 1992 to 100,714 in 2009.

The largest age group for the City of Murrieta is the mature working age population of people from 35 to 64 years of age. According to 2006-2008 American Community Survey estimates, this age group comprised about 35 percent of the total population in the City. Children made up the second largest age group, with about 31 percent of Murrieta's population under 18. Residents from 18 to 34 years old made up about 25 percent of the population, representing the entry level and less experienced working age population. Older adults over 65 years old made up the smallest age group for the City of Murrieta at approximately 9 percent in 2008.

[16] Ibid.

[17] California Department of Finance, 2009.

The 2006-2008 American Community Survey estimated that over one-quarter of the people in Murrieta identified themselves as Hispanic or Latino, of any race. Of the remaining population, over one-half of the residents were White, between 5 and 10 percent were Asian, and 4 to 6 percent identified themselves as Black or African American. Census 2010 will provide more exact information on the age and ethnicity of Murrieta residents.

ECONOMY

In 2009, employment opportunities in Murrieta are primarily driven by local household demand for products and services. The largest employment sectors are retail trade, with large employers such as Wal-Mart and Home Depot; local government, which includes schools and the City of Murrieta; and health care, including Southwest Healthcare. Together, such local-serving businesses provide nearly 78 percent of the jobs in Murrieta in 2008.[18]

The remaining 22 percent of jobs in Murrieta are export-base, meaning that their products or services are demanded outside Murrieta at the regional level or beyond. This type of business brings outside dollars into the community. Large employers in this sector include American Industrial Manufacturing Service and Cryoquip, Inc.

Murrieta has an educated, skilled labor force that is not accommodated by local jobs. Instead, 87 percent of the local labor force commutes outside of Murrieta to work.[19] This mismatch presents an opportunity to develop Murrieta's economic base by promoting economic diversification, particularly within the manufacturing, professional, scientific and technical, information and finance, and insurance sectors.

Economic Catalysts

A look at the surrounding regional economy indicates that Murrieta has the potential to attract firms that offer higher skilled jobs — especially due to its educated and skilled resident labor force, land use development opportunities, existing regional freeway accessibility, and plans for future transit.

Building on an existing strength, Murrieta is seeking to offer more opportunities for higher education closer to home. An extension facility of Azusa Pacific University is already located in Murrieta, and extension facilities of other institutions are found in neighboring cities. A satellite campus for California State University (CSU) San Marcos opened in Temecula through a cooperative effort by the City of Murrieta, City of Temecula, and Temecula Valley Unified School District, in which Murrieta provided a grant for tenant improvements. This cooperative effort brought the first four-year California State University to the Temecula Valley. In December 2008, the Murrieta City Council approved an 11.5-acre project called the Murrieta Education Center that is envisioned to accommodate satellite facilities for several colleges as well as a workforce development center. Located in the South Murrieta Business Corridor, the complex

[18] Source: Stanley R. Hoffman Associates.

[19] Ibid.

will house these facilities in two five-story buildings, with complementary retail planned for another building.

The opening of Loma Linda University Medical Center-Murrieta in 2011 is another economic catalyst as it expands the existing health care cluster. This teaching hospital will be poised for development that complements the facility.

A high-speed rail station in Murrieta, if constructed, would become a major catalyst for growth. Such a station is tentatively planned near the I-15/I-215 interchange.

1.4 2011 GENERAL PLAN UPDATE PROCESS AND COMMUNITY INPUT

In August 2009, the City entered into a contract with RBF Consulting to undertake a comprehensive General Plan Update, which culminated in the 2011 General Plan.

UNDERSTANDING MURRIETA

In this initial phase, the General Plan Team reviewed existing plans and studies, conducted site visits, and collected new data needed for the General Plan.

VISIONING PROCESS

The first phase of community participation in the General Plan Update was called "visioning" because it asked the community to help define a vision of what Murrieta should be in the future. Participation opportunities included workshops and surveys, as described below. The input received from the community through these various opportunities shaped the community priorities that are described in the Vision Chapter, and which were originally presented in the Community Vision Report.

Outreach

In January 2010, the City of Murrieta kicked off an outreach campaign to raise public awareness of the General Plan Update process and opportunities to participate. Early outreach efforts included "information centers" at City Hall and the Library, presentations to business groups, and staffed tables at local retailers (Wal-Mart) and the City's Recreation Expo. Outreach continued throughout the process with updates to the project website, press releases, and email newsletters.

Online Survey

Residents were invited to participate in an online survey from January 8 to February 8, 2010 and describe what about Murrieta they wanted to stay the same, the challenges they felt Murrieta needs to overcome, and their hopes for Murrieta's future (Treasures, Challenges, and Visions). There were 94 responses to the visioning survey.

Workshops

Visioning workshops began with the same questions as the survey, asking for ideas on Treasures, Challenges, and Visions. Participants then worked in groups to provide further direction on the popular topics. Students at Vista Murrieta High School participated in a youth visioning workshop which engaged 48 students from grades 9-12 on January 22, 2010 and led students to create vision statements for Murrieta. This was followed by two workshops for the community at large, held at Murrieta Mesa High School on the evening of Thursday, January 28, 2010 and duplicated on the morning of Saturday, January 30, 2010. Over 60 people participated in these community workshops, suggesting objectives and action steps for several topics.

A visioning workshop was held for the rural Los Alamos area on April 13, 2010. Approximately 50 participants did a Treasures, Challenges, Visions exercise and then worked in groups to write vision statements for the Los Alamos area.

Feedback on Community Priorities

A summary of the initial visioning input was placed online and provided a detailed description of participation in the survey and workshops. In that summary, the General Plan Team distilled all input into several "community priorities" for the future of Murrieta. The public was then asked to provide feedback on these community priorities through a second online survey and a room-wide polling exercise at the land use workshop on March 27, 2010.

A *Community Vision Report* presented the ten final community priorities, a summary of visioning activities, and verbatim input from the community. The report was posted on the General Plan Update website in August 2010.

LAND USE DIRECTION

The next major phase in the planning process considered and analyzed different scenarios for land use change, with many opportunities for community input.

Before commencing work on the General Plan Update, the City Council decided on four "Focus Areas" that were targeted for land use change:

- North Murrieta Business Corridor
- Clinton Keith/Mitchell Area
- Golden Triangle North (Central Murrieta)
- South Murrieta Business Corridor

These areas included key locations along freeway corridors that are suitable for major land development and redevelopment to carry out the City Council's economic development strategy. It also included rural residential areas north of Clinton Keith Road that are adjacent to major new development along I-215.

Through the General Plan Update process, three additional areas were identified:

- Multiple Use 3 (MU-3) – Land Use Change
- Historic Murrieta Specific Plan – Policy Input
- Los Alamos Hills – Policy Input

Community Workshops

The General Plan Team sought input on land use changes in five Focus Areas from local residents, property owners, and other stakeholders by holding a series of land use workshops from March to June 2010. A community workshop was held on March 27, 2010 in which participants worked in groups to provide general direction on land use in the five Focus Areas.

Local meetings were held in each of the Focus Areas to discuss land use in those areas. Formats of these meetings were tailored to the needs for each area. Generally, the first meeting for each area asked participants for open-ended input on land use, and a follow-up meeting presented land use alternatives for additional feedback. These meetings were held as follows:

- North Murrieta Business Corridor – March 23 and June 2, 2010
- Clinton Keith/Mitchell – March 25 and June 8, 2010
- South Murrieta Business Corridor – March 29, 2010
- Multiple Use 3 (MU-3) Area – April 22 and June 7, 2010
- Golden Triangle North – May 3 and June 10, 2010

The input received at those meetings, and submitted in writing, was summarized in the *Land Use Summary Report: Community Workshop and Land Use Area Meetings*, which was posted on the General Plan Update website in June 2010.

City Council and Planning Commission Workshops

Joint meetings of the City Council and Planning Commission were held on June 23, 2010 and July 6, 2010, so these officials could review a series of land use alternatives for five Focus Areas and provide direction to City Staff and the General Plan Team on a Recommended Land Use Alternative.

GOALS AND POLICIES / GENERAL PLAN DRAFTS

"Goals for a Healthy Murrieta" Workshop

A public workshop on October 21, 2010 had the dual purpose of obtaining direction on General Plan Update goals and hearing ideas on how Murrieta can be a healthy community. A brief presentation at the beginning of the workshop reviewed the purpose and progress of the General Plan Update. The presentation then described the relationships between the built environment and health, and provided information on health in Murrieta. Groups of participants were asked to write goals that could help the City to achieve the Community Priorities derived in the visioning process, and to suggest ways to promote health while pursuing those goals.

City Council and Planning Commission Workshops

Two joint workshops of the City Council and Planning Commission were held on November 30, 2010 and January 11, 2011 to provide a preview of the major features of the updated General Plan, in anticipation of the release of the public review draft. Presentations at these workshops reviewed some of the draft goals and policies, and introduced the concept of separating the land use map from the zoning map. Public comments were received at both workshops.

1.5 2019 FOCUSED GENERAL PLAN UPDATE PROCESS AND COMMUNITY INPUT

In 2019, the City contracted with RICK Engineering to prepare a Focused General Plan Update. Major components of the 2019 Focused General Plan Update include:

- Additions, deletions, or modifications to the 2011 General Plan goals, policies, exhibits and implementation to address changes in State law enacted since the adoption of the 2011 General Plan.
- Update of General Plan development projections to the year 2035.

- Update of the Land Use Element with a new land use designation (Innovation) and a revised mix and location of land use designations in six key areas.
- Revisions/streamlining of focus area goals, policies, text, and exhibits

New policy issues that are addressed in the 2019 Focused General Plan Update include:

- Wildfire Risks and Preparation (SB 1249),
- Climate Adaptation and Resiliency (SB 379),
- Transitions to Vehicle Miles Traveled (VMT) analysis away from Level of Service (LOS) (SB 743), and
- Environmental Justice (SB 1000).

The first public workshop (Workshop #1) was held at the Multi-Purpose Room, Vista Murrieta High School, 28251 Clinton Keith Road, Murrieta on November 17, 2018 (10 am – 1 pm). Workshop #1 presented information on key topics including:

- Project Overview
- Land Use Planning Program
- Changes in State Law since 2011
- Climate Change
- Circulation
- Water Resources

Workshop #1 afforded opportunities for members of the public to speak with the Project Team and to provide input on the various topics presented at the workshop. Approximately 60 individuals attended workshop #1 and a great deal of feedback was received.

Members of the Project Team and City staff also provided a tent at the City's annual Festival of Trees celebration on December 1, 2018 (5 pm – 7 pm) in order to reach out to the community and discuss the Project. The Project Team presented the same materials that were included at Workshop #1 to interested members of the public that stopped by the tent.

During November and December 2018, 31 surveys were received from property owners and/or members of the public which helped the Project Team and City staff to prepare the land use plan for the following public workshop in March 2019.

The second public workshop (Workshop #2) was held at the City of Murrieta Senior Center 5 Town Square, Murrieta on Saturday, March 16, 2019 (10:00am – 1:00pm). Workshop #2 presented information on key topics including:

- Project Overview
- Project Updates on the General Plan
- The Draft General Plan Land Use Policy Map 2035
- The Notice of Preparation (NOP) for the Supplemental Environmental Impact Report (SEIR)

During Workshop #2, the Project team and City staff gave project updates, presented the draft land use plan and collected feedback from the community. Approximately 50 people attended the workshop.

1.6 COMMUNITY PRIORITIES

The ten community priorities below describe the vision that members of the public provided for the future of their community during the preparation of the 2011 General Plan. The priorities guided the goals and policies in the 2011 General Plan and the 2019 Update.

- **Sustainable Economy.** Pursue economic vitality and longevity by attracting higher education and growing a base of clean industry, while maintaining the current housing affordability.
- **Transportation.** Improve roadway networks to reduce traffic, and provide a citywide system of bicycle lanes and recreational trails that improve accessibility without a car.
- **Infrastructure and Services.** Improve health care within the City, and continue to provide excellent school, police, fire, library, and recreation services.
- **Community Character.** Protect and foster a strong sense of community and safety, as well as the "small town" feeling.
- **Governance.** Promote community involvement and provide for a fiscally sound future.
- **Recreation and Culture.** Provide abundant parks and facilities for recreational activities, and cultural amenities.
- **Natural Environment.** Protect the natural beauty of the mountains, hills, and waterways.
- **Historic Downtown Murrieta.** Create a vibrant, prosperous Historic Downtown that serves as a community center and provides a variety of quality shopping and dining experiences.
- **Youth Amenities.** Provide ample activities for all ages of youth, and jobs for teens.
- **Rural Areas.** Preserve elements of Murrieta's rural heritage.

SUSTAINABLE ECONOMY

Pursue economic vitality and longevity by attracting higher education and growing a base of clean industry, while maintaining the current housing affordability.

Community members expressed a desire for economic development that would lead to more jobs—including high-paying jobs and jobs for teens—and fully occupied retail centers. Participants hoped to see development in Central Murrieta. They noticed local signs of the economic downturn, expressing concerns about commercial vacancies, foreclosures, and lower housing values. However, participants also considered the affordability of housing in Murrieta to be an asset.

To stimulate economic development, workshop groups suggested providing higher education, infrastructure, and incentives, as well as promoting downtown. One group felt that high-speed rail could provide an opportunity. Another group suggested constructing office buildings for large employers. Some areas of growth the groups identified were medical and bio-tech industries, “green” businesses, mixed use, and hotels. Hotel locations were suggested near the Loma Linda University Medical Center and in Central Murrieta, north of Murrieta Hot Springs Road between the 1-15 and 1-215 Freeways. Participants saw opportunities for Murrieta due to assets such as freeway access and an educated workforce.

Participants recognized the role of the City and the General Plan in directing land use and growth. They expressed the need to manage growth in order to provide adequate infrastructure and services, or to preserve certain qualities of the community that they value.

TRANSPORTATION

Improve roadway networks to reduce traffic, and provide a City-wide system of bicycle lanes and recreational trails that improve accessibility without a car.

Transportation systems are important to Murrieta residents to help them reach other regional destinations and to travel within the city. Participants said that Murrieta was conveniently located, but many would rather be able to work, shop, dine, and recreate in Murrieta instead of driving out of town.

Time spent in the car is clearly an issue for Murrieta residents, with many participants citing traffic as a concern — both on local streets and at freeway interchanges. Even teens brought up traffic as a challenge for the community. As individuals and in groups, participants suggested more connections for Clinton Keith, Diaz, Winchester, Washington, and Ynez, as well as more freeway overpasses and north/south connectivity to Temecula. Participants asked for more roads to be paved.

Community members also hoped to see a City-wide system of bicycle lanes. They sought recreational trails (including equestrian trails) that connect parks and open space, hoping that they could access these amenities without needing to drive. As discussed in the Natural Environment section above, a workshop group proposed a park with trails along the Murrieta Creek from Wildomar to Temecula. Another group echoed this group's suggestion of linking trails to Historic Downtown.

Groups discussing transportation also suggested developing other modes of transportation: Safe Routes to School, wheelchair-accessible connectivity, a trolley, golf carts in Historic Downtown, improved bus service, and rail connections to San Diego and Orange County.

INFRASTRUCTURE AND SERVICES

Improve health care within the City, and continue to provide excellent school, police, fire, library and recreation services.

Many participants considered Murrieta's school system to be a community treasure, and hoped it would continue to be strong in the future. They also valued the police and fire departments, recreation services, library, and senior center.

Health care was a concern — in particular, hospital services — and participants looked forward to the new Loma Linda University Medical Center. Participants desired more opportunities for higher education. They made suggestions for infrastructure, including facilities for water, sewer, and stormwater. Services suggested by participants included services for the homeless or near-homeless, and animal shelters.

COMMUNITY CHARACTER

Protect and foster a strong sense of community and safety, as well as the "small town" feeling.

Community members described Murrieta as safe, and placed importance on keeping it that way. Participants felt that Murrieta was great for families and wanted the community to be a safe, healthy environment for children in the future. Teens strongly valued the safety and sense of community they felt in Murrieta.

Residents expressed that Murrieta had a "small town" feel and sense of community. They valued community events and considered other people in Murrieta to be an asset.

Participants, including teens, referred to Murrieta as "clean," adding suggestions for more trees or landscaping, and image improvement. Participants expressed a desire for Murrieta to have a distinct identity.

GOVERNANCE

Promote community involvement and provide for a fiscally sound future.

Participants valued the opportunity to be involved in their community, including the General Plan Update workshops. They expressed concern about interference in Murrieta from special interests or excessive regulation from higher levels of government. Participants hoped for a fiscally sound future for Murrieta. They wanted leaders with vision, a responsive local government, communication with residents, and coordination with neighboring communities.

RECREATION AND CULTURE

Provide abundant parks and facilities for recreational activities, and cultural amenities.

Many comments related to recreation and culture. Community members value parks and outdoor activities. Suggestions for additional recreational facilities included a dog park, aquatic facility, and a skating rink. One workshop group suggested building a campground and also suggested that volunteers could contribute to recreation, for instance through an “adopt a trail” program.

Participants expressed a need for more dining and night life in Murrieta. Others hoped for more arts and culture events and facilities, such as a concert hall. One workshop group wanted to see cultural amenities that would attract residents aged 18-30.

NATURAL ENVIRONMENT

Protect the natural beauty of the mountains, hills, and waterways.

Community members value the natural beauty and clean air of Murrieta. Mountains, hills, and waterways were listed as treasures, with several calling out the Santa Rosa Plateau in particular. Participants cited open space as a treasure, and participants including youth expressed that natural areas should be retained in the future.

Participants identified that preservation would need to be balanced with development and the need to prevent flooding around waterways. Participants also identified property rights as a concern as it relates to preservation.

A workshop group that focused on open space and trails cited several benefits of quality of life, property values, sense of community, recreation, and wildlife preservation. This group suggested that connections between open space should be designed to work for people as well as for wildlife, and proposed a park with trails along the river from Wildomar to Temecula; they also suggested removing cement from the riverbed to allow groundwater recharge.

HISTORIC DOWNTOWN MURRIETA

Create a vibrant, prosperous Historic Downtown that serves as a community center and provides a variety of quality shopping and dining experiences.

Participants placed importance on Murrieta's historic downtown and Town Center, describing their envisioned downtown as "magical," "bustling," "prosperous," and "vibrant."

YOUTH AMENITIES

Provide ample activities for all ages of youth, and jobs for teens.

The General Plan Update Team heard directly from youth at Vista Murrieta High School, in a workshop attended by 48 students. These teens valued the schools, parks, programs and activities available in Murrieta, but felt a great need for more options in recreation, night life, and shopping. Teens wanted activities that they could do with their families, as well as with their friends. They also wanted more jobs, and opportunities to be involved in the community.

Teen participants suggested a teen night club, while a group of younger workshop participants asked for a pre-teen dance club. Another popular youth suggestion was a recreation/teen center. Teens also wished for more variety in shopping, and healthier restaurant options.

Suggestions from adults regarding youth included a teen center, activities, sports, mentoring and job skills training.Teens wrote their own vision statements for Murrieta, presented below.

Youth Vision Statements
Written by Vista Murrieta High School Students – January 22, 2010

"Murrieta is a diverse community in which the inhabitants can enjoy fine dining, activities, entertainment as well as the safety and security to raise families. It is also a place with a healthy environment and thriving economy. It is well designed, efficient and aesthetically pleasing."

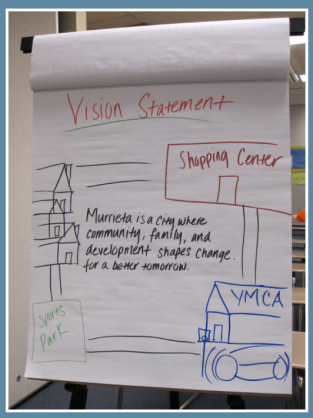
"Murrieta is still a safe place with a variety of entertainment and safe activities for families and kids to enjoy together."

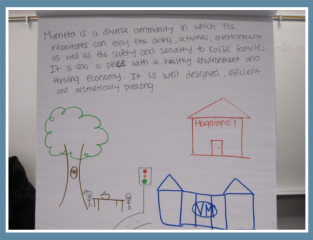
"The City of Murrieta is a safe and secure place to raise families and offers outstanding education in our great school districts. It is a diverse community that offers job opportunities and entertainment for kids as well as young adults."

"Murrieta is a city where community, family, and development shapes change for a better tomorrow."

"Murrieta is a city with an emphasis on safety, education, and opportunity in order to progress into an ideal society. Youth are able to feel close to those around them in the community while having a good time. Murrieta is a place that meets the wants and needs of the people."

"Murrieta is now a community with positive family and youth recreations, where education and safety is valued and first priority. Where there is less traffic, more economical opportunities for growth, and a clean environment."





RURAL AREAS

Preserve elements of Murrieta's rural heritage.

Community members value the "small town" feel around Murrieta, although they want the preservation of rural areas to be balanced with urban growth. Participants also expressed a need for additional infrastructure in rural areas, such as roads, water, and sewer.

There were several different components of this "small town" character that participants valued. Some wanted a feeling of openness, space, and country landscapes. Others cited the freedom to keep animals, ride horses, and grow food—or to have more privacy.

Residents in the Los Alamos area offered visions for their neighborhood that sought these types of rural elements, as well as large lot sizes and limited regulation, while providing more urban infrastructure.

Other participants suggested maintaining a rural feel by using elements such as split-rail fences, swales instead of curbs, greenways, and trails. One workshop group suggested ensuring compatible land uses near rural and agricultural areas. A survey participant proposed a living farm museum.

Insert Exhibit 1-1
Regional Location Map
11 x 17 color

Chapter 2
Vision

2.1 OVERVIEW

In 2020, the City of Murrieta completed a focused update of the Murrieta General Plan - the basic policies developed in the 2011 document that shape public and private development and the infrastructure that supports it have not been substantially changed. This General Plan Update addresses current policy issues and sets the course through 2035. The ten community priorities detailed in Section 1.6, describe the vision for the future of Murrieta.

Workshops during the 2011 and 2020 General Plan Update processes confirmed that residents value the "sense of community" and "quality of life" in Murrieta because of the advantages it offers, including:

- **Accessibility.** Murrieta is centrally located between San Diego and cities in Los Angeles and Orange Counties. In addition, Palm Springs and the desert communities are less than an hour drive from Murrieta. This provides accessibility to jobs, entertainment, and other regional attractions.

- **Educated Workforce.** Statistics show that the level of education for Murrieta residents is generally higher that other cities, with nearly 32% of its residents with a BA or advanced degree and 63% have attended college.

- **High Quality Schools.** Murrieta's high quality schools consistently exceed the State's exemplary mark!

- **Growing Regional Technology and Medical Hub.** Class A offices and business parks, as well as the new Loma Linda University Medical Center, support the community with resources, services, and employment.

- **Range of Housing.** Murrieta boasts a range of housing, from traditional single-family, estate and equestrian homes, to town-homes.

- **Safety.** The City of Murrieta has consistency been identified as one of the safest cities in California and the United States.

- **Quality of Life.** Close to 600 acres of parkland, miles of hiking and riding trails, Jack Nicklaus and Robert Trent Jones, Sr. designed golf courses, high-tech public library, and community events are all valued community amenities and services.

2.2 VISION 2035

A vision is an aspiration; it describes what people hope to see in the future, not necessarily what is true today. Pursuing the vision means translating broad priorities into more particular policies and actions.

Murrieta's vision is to build upon the great quality of life it currently has as a safe and family-oriented community, with top ranked K-12 schools, and recreational amenities, by capitalizing upon its community and economic strengths to be a regional employment destination for medical and technology hubs, employment centers, specialty retail, higher education, and a four-year State University. This emphasis on Economic Development marks a deliberate effort to direct investment toward building a strong economic base, a "sense of community, and great quality of life for generations to come.

EMPHASIS ON ECONOMIC DEVELOPMENT AND QUALITY OF LIFE

Murrieta's growth has largely been driven by residential development, but the 2011 and 2020 General Plan Updates mark a deliberate effort to direct investment toward building a strong economic base. Before starting the General Plan Update, the Murrieta City Council identified economic development as the City's top priority. To support that priority, the City Council established a Comprehensive Development Strategy presenting the 20-year vision that Murrieta will be a diversified business hub for Southwest Riverside County and North San Diego County.

The Economic Development Department's campaign to attract businesses and jobs has been aided by policies that provide a "business friendly" environment. The City has developed programs to streamline the permitting process, assisted developers with location, financing and fees, and encouraged entrepreneurial projects. All of these elements provide a climate of certainty to developers, which further strengthen Murrieta's reputation in being known as a city more businesses choose to locate. The Program Environmental Impact Report for the General Plan Update is another great tool, which developers can use to expedite entitlements and tier environmental documents – this also makes Murrieta a very attractive city for development.

To achieve this vision, the City seeks to encourage private sector investment in the creation of high paying jobs, income, and wealth through economic diversification. The City is focusing efforts to attract a variety of businesses, higher educational institutions, and health care facilities. A full range of quality new development will be part of this effort, including retail centers, corporate/technology parks, hotels, and upscale restaurants.

The 2020 General Plan Update revisions continue to align City policy with this emphasis on economic development, by directing public investments in infrastructure and promoting the development of shovel-ready sites. It targets key locations in its north and south freeway corridors for changes in land use and zoning that support the development of medical, educational, commercial, and business clusters. These key locations include the areas around the Loma Linda University Medical Center-Murrieta and the Murrieta Education Center as the economic catalysts.

Economic development is strongly linked to overall quality of life and two other major themes of the General Plan Update: sustainability and becoming a healthy community. Commuting is one example of a connection between these themes. When more are jobs available closer to home, Murrieta residents can reduce the amount of time that they spend commuting. This should reduce emissions from their cars, which benefits both the environment and human health. It would also provide residents with more time to spend in healthy activities with their families, enjoying the many parks, trails, events, and amenities of Murrieta.

The Vision describes the major opportunities and policy direction behind the 2011 and 2020 General Plan Updates. It also takes into account the characteristics of this community that should be maintained, as the City grows and matures. Those characteristics help create a sense of community, and promote involvement and participation in local government, schools, and community organizations.

Sustainability is commonly defined as the ability to meet current needs without compromising the ability of future generations to meet their own needs. In other words, it involves balancing current demands with future ones, and allowing natural and human resources to maintain their productivity and abundance.

Since the natural environment is an important part of Murrieta's identity and a resource that residents value, pursuing environmental sustainability is a way to enhance one of the City's major assets. In this pursuit, Murrieta can also promote community health and provide a quality of life that drives a strong economy. Throughout the 2020 General Plan Update, goals and policies are included that reflect continuing to create a great quality of life, through sustainable qualities and a healthy community.

Chapter 3
Land Use Element

3.1 INTRODUCTION

The Land Use Element establishes the anticipated patterns of development activity and land use that support, implement, and enhance the City's future vision. The Land Use Element will provide the primary guidance in the way Murrieta grows and changes through 2035. It will serve as the City's primary policy guidance tool for land use decision-making and expresses the type, intensity, and distribution of land uses.

A key component of the Land Use Element is the Land Use Policy Map, which depicts the location of the permitted type and density/intensity of all land uses within the City. Other components include a summary of existing land uses in the City, quantification of 2035 buildout, and the fundamental goals and policies that provide the framework for land use planning and decision making in the City.

The following Community Priorities relate most directly to this Element:

- Pursue economic vitality and longevity by attracting higher education and growing a base of clean industry, while maintaining the current housing affordability.
- Protect and foster a strong sense of community and safety, as well as the "small town" feeling.
- Preserve elements of Murrieta's rural heritage.
- Protect the natural beauty of the mountains, hills, and waterways.
- Provide abundant parks and facilities for recreational activities, and cultural amenities.

3.2 AUTHORITY FOR ELEMENT

California *Government Code* Section 65560 (a) requires that the General Plan address:

> *"...a Land Use Element which designates the proposed general distribution and general location and extent of the uses of the land for housing, business, industry, open space including agriculture, natural resources, recreation and enjoyment of scenic beauty, education, public buildings and grounds, solid and liquid waste disposal facilities and other categories of public and private uses of land."*

3.3 SETTING THE CONTEXT: KEY ISSUES AND CHALLENGES

The Land Use Element is intended to enhance the community through the application of land use policies that reflects the community's current and envisioned needs. Murrieta recognizes that the effective management of growth and change must address the key factors in order to influence the successful implementation of the community's priorities.

GROWTH AND CHANGE

The City of Murrieta's General Plan includes both the incorporated City Limits and the Sphere of Influence. The Planning Area is comprised of 26,852 acres (41.96 square miles) of which 21,511 acres (33.61 square miles) is located within the City Limits and 5,341 acres (8.34 square miles) is located within the City's Sphere of Influence. The County of Riverside is currently responsible for the administration of land use decisions within the Sphere of Influence.

Table 3-1, *Existing Land Use Summary*, provides a breakdown of existing land uses on the ground by use type for the year 2009 and the percentage of area for each use within the City.

SPECIFIC PLANS

Prior to the incorporation of the City, the County of Riverside utilized Specific Plans to guide growth for large tracts of land in Murrieta. Subsequent to the City's incorporation, Specific Plans continued to be a useful tool in guiding development policy in the City of Murrieta. As of January 2011, the City of Murrieta has 12 adopted Specific Plans within its jurisdiction, as shown on *Exhibit 3-1*, *Specific Plans*, which illustrates the location and currently approved buildout for each specific plan.

Table 3-1
Existing Land Use Summary[1]

Land Use	Acres	Percent of Area
Single-Family Residential	6,560.08	30.50
Multiple-Family Residential	238.35	1.11
Mobile Home	1,036.26	4.82
Commercial Retail	612.15	2.85
Commercial Restaurant	28.66	0.13
Commercial Recreational	20.57	0.10
Commercial Office	127.04	0.59
Commercial Hotel/Motel	1.90	0.01
Commercial	32.64	0.15
Industrial	254.11	1.18
Public/Institutional	229.26	1.07
Parks and Recreation/Open Space	148.53	0.69
Golf Course	518.83	2.41
Miscellaneous (easements, etc.)	41.38	0.19
Cemetery	9.84	0.05
Agricultural	1,011.09	4.70
Vacant	7,291.23	33.90
Roads	3,348.69	15.57
TOTAL CITY ONLY	**21,510.60**	**100.00**
Sphere of Influence	5,340.95	
TOTAL WITH SPHERE OF INFLUENCE	**26,851.55**	

Notes:
[1] Existing Land Use summary based upon available Riverside County Tax Assessor Data, 2009. Uses defined utilized county land use codes and represent a general description of the existing type of use on a parcel. Does not include the Sphere of Influence.

Specific Plan 276 (The Triangle)

Specific Plan 276 was adopted on October 30, 1990 by the County of Riverside and is known as the Triangle Specific Plan. The Specific Plan is located generally east of the I-15 Freeway, west of the I-215 Freeway, and south of Murrieta Hot Springs Road.

Specific Plan 276 (The Triangle) proposes a plan for a 1,767,914 square foot regional shopping center/mall, comprised of retail, office, restaurant, entertainment, and hotel uses on approximately 64 acres (refer to *Table 3-2*, *Specific Plan 276 (The Triangle*). The Specific Plan proposes development of the area within three phases and envisions a Regional Mall on approximately 51.5 acres containing eight major anchor tenants, a food court, multi-screen cinema complex, and smaller retail shops. The remainder of the site is proposed to include eight free-standing building pads with restaurants, retail shops, office space, hotel, and financial services. The Specific Plan includes development standards, including Commercial Design Guidelines.

Table 3-2
Specific Plan 276 (The Triangle)

Land Use	Acres	Square Feet
Regional Commercial	51.5	1,566,714
Office/Retail	2.9	90,000
Restaurant	3.0	11,200
Hotel	4.5	90,000
Retail	1.6	10,000
TOTAL	**63.5**	**1,767,914**

Copper Canyon Specific Plan (SPM 9)

The Copper Canyon Specific Plan was adopted on April 26, 1996. The Specific Plan is comprised of 579 acres located in the western portion of the City, adjacent to the City's western City limit. The Copper Canyon Specific Plan proposes development of a mixed-use master planned community with up to 1,027 dwelling units on 291.5 acres, 14.1 acres of neighborhood commercial uses, 18.8 acres of recreational park areas, 55.0 acres of natural open space, and 17.2 acres of roadways. A 167.3-acre 18-hole golf course and 5.1 acre golf clubhouse are also proposed along with a conference center. The golf course and clubhouse have not been constructed. Refer to *Table 3-3*, *Copper Canyon Specific Plan*.

Table 3-3
Copper Canyon Specific Plan

Land Use	Acres	Dwelling Units
Single-Family Residential	291.5	1,027
Neighborhood Commercial	14.1	
Recreational Park	18.8	
Natural Open Space	55.0	
Roadways	17.2	
Golf Course (Not Built)	167.3	
Golf Clubhouse/Conference Center (Not Built)	5.1	
TOTAL	**579.0**	**1,027**

Creekside Village Specific Plan (SPM 15)

The Creekside Village Specific Plan was adopted in May 2002 and amended in August 2003. The Specific Plan consists of approximately 145 acres located east of the I-215 Freeway and south of Murrieta Hot Springs Road and its intersection with Whitewood Road. The Specific Plan proposes 500 residential units on 97.74 acres, 10.03 acres for an elementary school, 19.28 acres of natural creek and related vegetation, 4.43 acres for greenways/village green, and 13.64 acres for roadways and runoff treatment basins (refer to *Table 3-4*, *Creekside Village Specific Plan*). The Specific Plan includes four potential alternatives with Alternative 3 allowing up to 780 residential units and an elementary school. The Specific Plan includes land use regulations and design standards for the area. Alternative 4 is the final negotiated plan, based upon settlement of a lawsuit and court approved agreement.

Table 3-4
Creekside Village Specific Plan

Land Use	Acres	Lot Size (sf)	Dwelling Units
Single-Family Residential	13.33	7,200	50
Single-Family Residential	29.82	6,000	170
Single-Family Residential	20.25	5,500	110
Single-Family Residential	34.34	5,000	170
Elementary School[1]	10.03		
Greenways/Village Green	4.82		
Open Space (Creek & Buffer)	19.28		
Collector/Major Road ROW	6.49		
Landscaped Slope Banks	4.43		
Runoff Treatment Basins	2.33		
TOTAL	**145.12**		**500**

sf = square feet

Notes:
[1] Replacing the elementary school with residential lots adds 50 lots for a total of 550 lots.

Golden City Specific Plan (SPM 5)

The Golden City Specific Plan was originally adopted in November 1996. Substantial Conformance No. 1 was approved in June 1999. Amendment No 1. was approved in September 2008 to allow 42 acres for a professional office park district. The Golden City Specific Plan is located in the northern portion of the City. It is generally located east of Antelope Road and the I-215 Freeway, west of the City's Sphere of Influence, north of Baxter Road and south of Brian's Way. The Specific Plan is comprised of approximately 248 acres. The Specific Plan allows for 502 dwelling units on 148.8 acres. Non-residential uses include professional office park (42.0 acres), fire station (5.3 acres), open space (34.3 acres), neighborhood park (11.6 acres), green belts (1.5 acres), and detention basins (4.5 acres); (refer to *Table 3-5*, *Golden City Specific Plan*). The development guidelines provide for a Neo-traditional planned community, providing a close integration of land uses.

Table 3-5
Golden City Specific Plan

Land Use	Acres	Lot Size (sf)	Dwelling Units
Single-Family 1 Residential[1]	126.7	Minimum 6,000	405
Single-Family 2 Residential	22.1	Minimum 6,000	97
Professional Office Park	42.0		
Fire Station	5.3		
Open Space	34.3		
Neighborhood Park	11.6		
Greenbelts	1.5		
Detention Basins	4.5		
TOTAL	**248**		**502**

Notes:
[1] Includes 10 acres for a school site.
Reflects development potential per Substantial Conformance No. 1 (99-047) and Amendment No. 1 (2008).

Greer Ranch Specific Plan (SPM 2)

The Greer Ranch Specific Plan was adopted in September 1995. The Greer Ranch Specific Plan area consists of approximately 555 acres located along the northerly boundary of the City, north of Clinton Keith Road and west of the I-215 Freeway. The Specific Plan area is characterized by two valleys created by three northeast to southwest trending ridgelines.

The Specific Plan permits 688 residential dwelling units in 12 planning areas, ranging from gross densities of 0.5 dwelling units per acre (du/ac) to 3.8 du/ac. The residential development area is approximately 333.1 acres (60 percent) of the site. Approximately 196.8 acres (35.5 percent) of the site would be maintained as open space, predominately comprised of natural areas. Approximately 17.9 acres (3.2 percent) of the site would be developed for recreational use, including a 4.3 acre private Community Center for the residents of Greer Ranch and a

13.6-acre public Neighborhood Park. The remaining 7.2 acres (1.3 percent) would serve the circulation system. Refer to *Table 3-6*, *Greer Ranch Specific Plan*.

The purpose of the Greer Ranch Specific Plan is to provide a set of master plans, guidelines, regulations, and implementation programs for guiding and ensuring the orderly development of Greer Ranch.

Table 3-6
Greer Ranch Specific Plan

Land Use	Acres	Dwelling Unit/ Acre Range	Dwelling Units
Medium High Residential	32.6	6.0	165
Medium Residential	163.3	4.0 – 5.0	610
Low Residential	96.1	1.0	50
Open Space	221.9		
Neighborhood Park	14.0		
Community Center	6.4		
TOTAL	**550.0**		**825**

Downtown Murrieta Specific Plan (SPM 8)

The Historic Murrieta Specific Plan, predecessor to the Downtown Murrieta Specific Plan, was adopted in October 2000, amended in February 2003 and March 2017, when it was renamed. The Downtown Murrieta Specific Plan consists of approximately 252 acres bounded by Kalmia Street on the north, Ivy Street on the south, Hayes Avenue on the west and Jefferson Avenue on the east. The Specific Plan area is essentially the original "Murrieta Town Site" subdivided by the Temecula Land and Water Company in 1884. The Specific Plan establishes policy direction to guide future development within Downtown Murrieta.

The Downtown Murrieta Specific Plan has guided streetscape improvements and other projects aimed at creating a vital downtown area

The Specific Plan includes six land use designations/zones: Rural Residential, Residential – Single Family 1, Residential – Single Family 2, Multi-family, Mixed-use, and Civic/Institutional.

Site development standards and land use regulations are provided for each land use designation/zone. Site design and architectural design guidelines and a streetscape plan with text and illustrations provide an overall vision for Downtown Murrieta. At buildout, the Downtown Murrieta Specific Plan would allow for 1,566 residential dwelling units and 1,229,000 square feet of non-residential uses. Refer to *Table 3-7*, Downtown *Murrieta Specific Plan*.

Table 3-7
Downtown Murrieta Specific Plan

Land Use	Acres	Dwelling Unit/ Acre Range	Dwelling Units	Square Feet
Rural Residential (RR)	16.2	Up to 0.5	8	
Residential - Single-Family 1 (RS-1)	37.1	Up to 5	74	
Residential - Single-Family 2 (RS-2)	23.9	Up to 10[1]	96	
Residential - Multi-Family (RMF)	45.1	18 to 30	812	
Civic/Institutional (CI)	58			279,000
Mixed Use	60	Up to 24	576	950,000[2]
Floodway	12.5			
TOTAL	**252.8**		**1,566**	**1,229,000**

[1] Density up to 15 dwelling units may be granted for Single-Family Attached housing projects.
[2] Assumes 300,000 SF of commercial and 650,000 SF of office.

Murrieta Highlands Specific Plan (SPM 1)

The Murrieta Highlands Specific Plan was originally adopted in October 1995. Substantial Conformance No. 1 was approved in July 1999. The Specific Plan area is comprised of 419 acres generally located north of Brian's Way and Keller Road, east of Antelope Road and the I-215 Freeway, west of Pitman Lane, and south of Scott Road and rural residential land uses. The Specific Plan provides for 1,167 dwelling units on 277.5 acres and 67.3 acres of commercial uses. Additional uses include an elementary school (12.6 acres), neighborhood parks (22.5 acres), multi-purpose greenbelt (11.9 acres), and open space (27.2 acres); refer to *Table 3-8, Murrieta Highlands Specific Plan*. The development plan emphasizes a pedestrian-oriented environment with recreational uses that are within walking distances inside the community.

Table 3-8
Murrieta Highlands Specific Plan

Land Use	Acres	Lot Size (sf)	Dwelling Units
Single-Family Residential	281.4	6,000	872
Single-Family Residential	59.1	7,000	295
Commercial	67.3		
Elementary School	12.6		
Neighborhood Park #1 (East)	12.3		
Neighborhood Park (West)	10.2		
Multi-Purpose Greenbelt	11.9		
Open Space Natural Resource (Knoll)	7.0		
Open Space #2 (Buffer)	20.1		
TOTAL	**419.0**		**1,167**
Note: Reflects development potential per Substantial Conformance No. 1.			

Murrieta Oaks Specific Plan (SPM 10)

The Murrieta Oaks Specific Plan was adopted on June 20, 2000. The Specific Plan is comprised of approximately 259.6 acres located in the area between the I-15 Freeway and the I-215 Freeway, north of Los Alamos Road, with Clinton Keith Road crossing the site at the northern edge. The Specific Plan proposes residential, open space, and recreational uses, as well as the potential for an elementary school. The land use plan proposes a cluster development to maintain significant natural features, such as the ridgeline, steep hillside areas, and drainage courses. Without an elementary school, four residential neighborhoods would contain up to 600 dwelling units. With an elementary school the four residential neighborhoods would accommodate up to 560 dwelling units. The elementary school would be located on 10.0 acres. The natural system would consist of 76.02 acres designated for natural hillside, conserved creek open space, and the natural hillside is not in slope bank, but subject to fuel modification. Modified open space would consist of 33.58 acres and include a neighborhood park (5.13 acres), landscaped slope banks, and a trail system with picnic/rest areas, and fuel modification areas. The remaining area would consist of roadways. Refer to *Table 3-9*, *Murrieta Oaks Specific Plan*.

Table 3-9
Murrieta Oaks Specific Plan

Land Use	Acres	Dwelling Units
Single-Family Residential	140.00	560
Elementary School	10.00	
Parks and Recreation	5.13	
Natural Open Space	104.47	
TOTAL	**259.60**	**560**

Murrieta Springs Specific Plan (SP 309)

The Murrieta Springs Specific Plan was adopted in June 2002. The 697-acre Murrieta Springs Specific Plan is located east of the I-215 Freeway, adjacent to the western edge of Winchester Road, north and west of Borel Road and west of the French Valley Airport Road entrance. The Specific Plan area was annexed into the City of Murrieta in July 2002. The Specific Plan proposes a master-planned community, primarily composed of residential, open space, commercial, an elementary school and recreation land uses. The Specific Plan allows for a maximum of 2,202 dwelling units on 415.3 acres, an elementary school of 12.7 acres, two active park sites totaling 22.7 acres, 209.6 acres of open space, 9.4 acres of commercial uses, 27.3 acres of primary roadways, and 5.23 acres of expanded landscape parkways (refer to *Table 3-10*, *Murrieta Springs Specific Plan*). The Specific Plan includes land use development standards and design guidelines for the area.

Table 3-10
Murrieta Springs Specific Plan

Land Use	Acres	Density	Dwelling Units	Square Feet
Medium Residential	232.7	4.2 du/ac	967	
Medium High Residential	146.1	5.8 du/ac	854	
High Residential	36.5	10.4 du/ac	381	
Commercial	9.4			108,900[1]
School	12.7			
Parks	22.7			
Natural Open Space	209.6			
Project Roads	27.3			
TOTAL	**697.0**		**2,202**	**108,900**

du/ac = dwelling unit per acre

Notes:
[1] Assumes a 0.25 Floor Area Ratio.

Santa Rosa Highlands Specific Plan (SPM 20)

The Plaza de Murrieta Specific Plan was adopted in September 2007 and is now called the Santa Rosa Highlands Specific Plan. The Specific Plan is located on approximately 52.25 acres at the northeast corner of Jefferson Avenue and Lemon Street. The Santa Rosa Highlands Specific Plan proposes a mixed-use master planned community within five planning areas with up to 95 single family detached units on 17.70 acres, 140 Townhome-1 residential units on 14.08 acres, 68 Townhome-2 residential units and 19 live/work residential units on 6.07 acres specifically designed to accommodate home-based businesses, and a Village Commercial center on 7.66 acres. Within the center of the community, a 1.50 Central Park is proposed with opportunities for active and passive recreational uses. The remaining acreage would consist of pocket parks, landscaped paseos, and roadways. Refer to *Table 3-11*, *Santa Rosa Highlands Specific Plan*.

Table 3-11
Santa Rosa Highlands Specific Plan

Land Use	Acres	Density (DU/AC)	Dwelling Units	Square Feet
Single-Family Detached Residential	17.70	5.4	95	
Townhome 1 Residential	14.08	9.9	140	
Townhome 2 Live/Work Residential	6.07	14.3	87	
Village Commercial	7.66			84,000
Open Space	4.03			
Circulation	2.71			
TOTAL	**52.25**		**322**	**84,000**

The Specific Plan includes a Pedestrian Connectivity Plan with a system of extensively landscaped paseos, sidewalks, and pedestrian pathways to facilitate walking throughout the area. The Specific Plan encourages an "Urban Village" for the commercial component of the site with a "Main Street" design concept. The Specific Plan establishes planning standards, architecture design guidelines for each planning area, and site design guidelines for the various land uses to promote a consistent and compatible development with a "French Cottage" style.

The Vineyard Specific Plan (SP 215)

The Vineyard Specific Plan was originally approved in February 1988 and then revised and certified complete in September 1988. Since then, four substantial conformances to the Specific Plan have been approved to facilitate minor modifications to planning area boundaries, to relocate uses within the planning area, and to facilitate minor modifications to the alignment of Kalmia Street, while remaining consistent with the intent of the approved Specific Plan.

The Specific Plan is located in the western portion of the City, adjacent to the City's western City limit. The Vineyard Specific Plan consists of approximately 521 acres and allows for a maximum of 1,306 dwelling units on 332.5 acres. Approximately 171.7 acres of open space would be maintained, including 155.6 acres of passive open space and 16.1 acres of active park. Neighborhood commercial uses would be located on 4.8 acres. Refer to *Table 3-12*, *The Vineyard Specific Plan*. Development standards and design guidelines, including community elements, architectural guidelines, and landscape guidelines are identified in the Specific Plan.

Table 3-12
The Vineyard Specific Plan

Land Use	Acres	Lot Size (sf)	Dwelling Units
Single-Family Residential	332.5	Minimum 7,200	1,306
Neighborhood Commercial	4.8		
Roads	12.0		
Recreation/Park	16.1		
Open Space	155.6		
TOTAL	**521.0**		**1,306**

Note: Reflects development potential per Substantial Conformance No. 4.

Specific Plan 310

Specific Plan 310 was adopted in December 2001 and amended in December 2004. The purpose of the Specific Plan is to delineate a mixed-use residential development plan encompassing approximately 1,734.5 acres located in the Winchester area of unincorporated Riverside County. Approximately 160 acres of the 1,734.5 acres are within the Murrieta Sphere of Influence.

The land use concept creates a community with a historic California theme comprised of up to 4,186 residential units located within three distinct villages focused around a championship 18-hole golf course integrated into natural habitat/open space and uniquely themed, pedestrian-oriented mixed-use core areas. The Specific Plan identifies 37 planning areas supplemented by greenbelts and roadways. Overall the Specific Plan allows for 4,186 residential dwelling units on 768 acres, including 1,096 dwelling units within the residential portion of the Mixed-Use designation; 200.8 acres of Mixed Use; 142.4 acres of commercial uses, including 11.4 acres of Commercial within the Mixed Use area; 147.7 acres of commercial recreation; and 463.1 acres of Open Space/Recreation/School uses (refer to *Table 3-13*, *Specific Plan 310*). The Specific Plan includes planning standards and design guidelines for the area.

Table 3-13
Specific Plan 310

Land Use	Acres	Density Range	Dwelling Units
Mixed Use	200.8	6	1,096
Commercial Recreation	172.6		
Commercial	42.4		
Medium High Density Residential	291.9	6	1,593
Medium Density Residential	342.6	4	1,261
Low Density Residential	129.8	2	236
Paseo*/Greenbelt**	39.0		
Open Space	93.5		
Golf	218.6		
Parks***	47.6		
Schools (2 Elementary, 1 Middle)	44.0		
Circulation	108.2		
TOTAL	**1,734.6**	**2.41**	**4,186**

Notes:
* San Diego Aqueduct Paseo (28.0 acres)
** Within planning areas (11.0 acres)
*** Includes two mini-parks (10.0 acres)

REGIONAL PLANNING CONSIDERATIONS

The City of Murrieta collaborates with a number of Federal, State and local authorities to implement regional, State and Federal mandates.

Multiple Species Habitat Conservation Plan

The Western Riverside County Multiple Species Habitat Conservation Plan (*MSHCP* or Plan) is a comprehensive, multi-jurisdictional Habitat Conservation Plan (HCP) focusing on Conservation of species and their associated Habitats in Western Riverside County. This Plan is one of several large, multi-jurisdictional habitat-planning efforts in Southern California with the overall goal of maintaining biological and ecological diversity within a rapidly urbanizing region. Large-scale HCP planning efforts have been completed in San Diego and Orange Counties. The *MSHCP* will allow Riverside County (hereafter, the County) and its Cities to better control local land-use decisions and maintain a strong economic climate in the region while addressing the requirements of the State and Federal Endangered Species Acts.

Murrieta is a Permittee under the *Western Riverside Multiple Species Habitat Conservation Plan* (*MSHCP*), and as such, has existing conservation agreements and also sets aside land parcels within the City as Conservation Land to meet the land acquisition goals of the *MSHCP*. The conceptual conservation scenario for the MSHCP Reserve Area is based on existing public lands, undeveloped land (Core Areas), and identified potential Linkages between the Core Areas.

Warm Springs and Murrieta Creeks are important natural features within the City that are protected for their biotic and aesthetic value; they offer wetland resources and allow for wildlife migration. These features are included in the *MSHCP* as potential Linkages between Core Areas.

For discussion and planning purposes, the Core Areas and Linkages are grouped into Area Plans and Subunits, as shown in *Exhibit 8-3*, *MSHCP Area Plans and Subunits*, in the Conservation Element. The *MSHCP* identifies the following Biological Issues and Considerations for the Subunits within the City and the Sphere of Influence:

- **Murrieta Creek (SU1) and Santa Rosa Plateau (SU6).** Maintain habitat function as riparian and aquatic species live-in habitat and large mammal movement linkage.

- **French Valley/Lower Sedco Hills (SU5) and Warm Springs Creek/French Valley (SCM1).** Maintain habitat Core for narrow endemic plants (saline/alkali and clay), Quino checkerspot butterfly, Riverside fairy shrimp, Los Angeles pocket mouse, western pond turtle, and habitat linkages through the City limits (east-west and north-south) for wildlife movement and plant dispersal.

Airport Land Use Considerations – French Valley Airport

Per the California State Aeronautics Act (*Public Utility Code* Sections 21670 et. seq.), the Riverside County Airport Land Use Commission (RCALUC) has two primary functions: 1) prepare and adopt and airport land use compatibility plan, and 2) review the plans, regulations, and other actions of local agencies and airport operations with the land use compatibility plan. On October 14, 2004, the RCALUC adopted the *Riverside County Airport Land Use Compatibility Plan*.

The RCALUC is concerned only with the potential impacts related to: 1) exposure to aircraft noise, 2) land use safety with respect to people on the ground and occupants of aircraft, 3) protection of airport airspace, and 4) general concerns related to aircraft overflights.

The RCALUC reviews major land use actions (refer to pages 2-6 and 2-7 of *Compatibility Plan*):

1) Actions affecting land uses within any compatibility zone.
2) Proposed non-aviation development of airport property if such development has not been previously included in an airport master plan or community general plan review by the RCALUC.
3) Any proposal for construction or alteration of a structure (including antennas) taller than 200 feet above the ground level at the site.
4) Any other proposed land use action, as determined by the local planning agency, requiring review by the RCALUC.

Portions of Murrieta are located within Compatibility Zones B1, C, D, and E, as well as the Height Review Overlay Zone (refer to *Exhibit 3-2*, *French Valley Airport Compatibility Zones*).

A Master Plan for the French Valley Airport was adopted by the Riverside County Board of Supervisors on September 28, 2010 and is reflected in a 2011 amendment to the Riverside County Airport Compatibility Plan. The primary objective of the French Valley Airport Master Plan Study is to develop and maintain a financially feasible long-term development program that will satisfy aviation demand and be compatible with community development, other transportation modes, and the environment. The accomplishment of this objective requires the evaluation of the existing airport and a determination of what actions should be taken to maintain an adequate, safe, and reliable airport facility to meet the air transportation needs of the area. The completed Master Plan provides an outline of the necessary development and gives responsible officials advance notice of future needs to aid in planning, scheduling, and budgeting. Specific objectives of the French Valley Airport Master Plan are:

- To determine the projected aviation demand and identify the facilities necessary to accommodate the demand.
- To determine projected needs of airport users for the next 20 years by which to support airport development alternatives.
- To evaluate the current and future airport design standards.

- To recommend improvements that will enhance the airport's safety and capacity to the maximum extent possible.
- To identify a suitable airport traffic control tower (ATCT) location.
- To establish a development schedule and a program for proposed improvements.
- To prioritize the airport capital improvement program.
- To prepare a new airport layout plan (ALP) in accordance with the Federal Aviation Administration (FAA) and the California Department of Transportation (CALTRANS) guidelines.

SPHERE OF INFLUENCE

The Sphere of Influence area is comprised of 5,341 acres east of the City's boundary, generally located south of Scott Road, west of Winchester Road (SR-79) and north of Clinton Keith Road/Los Alamos Road. The area includes:

- 2,516 acres currently pre-zoned Rural Residential (RR)
- 1,955 acres pre-zoned Estate Residential 2 (ER-2)
- 108 acres pre-zoned Single-Family 1 (SF-1) Residential
- 149 acres pre-zoned Business Park (BP)
- 40 acres pre-zoned Community Commercial (CC)
- 175 acres pre-zoned Specific Plan (SP)

To preserve agricultural uses, the Williamson Act established an agricultural preserve contract procedure by which counties or cities within California can tax landowners at a lower rate, in return for a guarantee that these properties will remain under agricultural production for a period of 10 years.

According to the California Department of Conservation, approximately 58 acres of Williamson Act encumbered acreage are located outside of the City boundary within the Sphere of Influence, as shown in *Exhibit 8-5*, *Williamson Act Farmland (2006)*, in the Conservation Element. None of these contracts are in non-renewal status with the State of California.

FOCUS AREAS

As noted in Chapter 2, Vision, prior to commencing the 2011 General Plan Update, the Murrieta City Council identified economic development as the City's top priority. To support that priority, the City Council established a Comprehensive Development Strategy presenting the 20-year vision that Murrieta will be a diversified business hub for Southwest Riverside County and North San Diego County. To achieve this vision, the City seeks to encourage private sector investment in the creation of high paying jobs, income, and wealth through economic diversification. The City is focusing efforts to attract a variety of businesses, higher educational institutions, and health care facilities. A full range of quality new development was part of the

2011 General Plan Update, including retail centers, corporate/technology parks, hotels, and upscale restaurants.

To compliment the economic development vision, the City Council identified four areas in the City for potential land use reevaluation as part of the 2011 General Plan Update, primarily along the I-15 and I-215 Freeway corridors: North Murrieta Business Corridor, Clinton Keith/Mitchell, Golden Triangle North (Central Murrieta), and South Murrieta Business Corridor. Through the 2011 General Plan Update process, three additional areas were identified: Multiple Use 3 (MU-3), Historic Murrieta Specific Plan, and Los Alamos Hills. These areas have been referred to as "Focus Areas" throughout the 2011 General Plan Update process as shown on *Exhibit 3-3*, *General Plan 2035 Focus Areas*. A brief discussion of the location and background for each Focus Area is provided below.

Since the 2011 General Plan Update, City staff have heard from property owners and/or members of the public that it has been difficult to develop in some portions of the Focus Areas. The 2020 General Plan Update includes a new land use designation (Innovation) and a revised mix and location of land use designations that in many instances overlap with the Focus Area boundaries. The 2020 General Plan Update's revisions help to support growth within the Focus Areas. In an effort to address these changes and streamline the 2020 General Plan, the policies of the individual Focus Areas have been incorporated into other goals of the Land Use Element.

North Murrieta Business Corridor

LOCATION

The North Murrieta Business Corridor encompasses approximately 816 acres and is located on the east side of the I-215 Freeway and extending to the eastern city-limit boundary, north of Clinton Keith Road, and generally south of Scott Road (but mostly south of Keller Road).

BACKGROUND

The areas generally include vacant, underutilized, or rural residential properties. The catalysts for reevaluating the land uses as part of the 2011 General Plan Update are the construction of the new Loma Linda University Medical Center and the desire to create a medical corridor and a high technology/office/research employment center, along with commercial uses that support business and employment needs, such as restaurants or hotels.

Clinton Keith/Mitchell

LOCATION

The Clinton Keith/Mitchell area encompasses approximately 280 acres, and is located west of the I-215 Freeway, north of Clinton Keith Road, and south of the Greer Ranch development.

BACKGROUND

The area is developed with large-lot single-family homes and retail uses, including a regional commercial shopping center, and can be generally characterized as rural residential in nature. The catalyst for reevaluating the land uses as part of the 2011 General Plan Update is the

encroachment of development surrounding the area and the impact of that development on the rural lifestyle.

Golden Triangle North (Central Murrieta)

LOCATION

The Golden Triangle North (Central Murrieta) area encompasses approximately 218 acres, and is an area located between the I-15 and I-215 Freeways, south of Los Alamos Road and generally north of Murrieta Hot Springs Road.

BACKGROUND

The catalysts for reevaluating the land uses as part of the 2011 General Plan Update are the Crossroads Corporate Center and the Rancho Springs Medical Center. Portions of this area have been developed, but the remainder is vacant or occupied with single-family homes or small businesses on the properties.

South Murrieta Business Corridor

LOCATION

The South Murrieta Business Corridor is located west of the I-15 Freeway, extending to Adams Avenue to the west and south of Murrieta Hot Springs Road to the southern City boundary.

BACKGROUND

The catalyst for reevaluating the land uses as part of the 2011 General Plan Update is the Murrieta Education Center, which introduces Class A office buildings to the area. Properties considered for land use changes are primarily vacant or underutilized. As part of the 2020 General Plan Update, South Murrieta Business Corridor was expanded to account for changes in the 2035 Land Use Policy Plan.

Multiple Use 3 (MU-3)

LOCATION

The MU-3 area encompasses approximately 201 acres, and is primarily located on the west of the I-15 Freeway.

BACKGROUND

This area is developed with both commercial and multi-family uses, and most of the area is presently developed.

The catalyst for reevaluating the land uses as part of the 2011 General Plan Update is the past interpretations of how this designation has or should be developed; these interpretations has resulted in parcels with 100 percent commercial or 100 percent multi-family developed on individual parcels, as opposed to a true mix of multiple uses on a parcel.

Land uses considered for the developed areas are consistent with actual uses. There are a number of parcels that are vacant, single-family residential, underdeveloped, or a combination

of single-family and commercial businesses. Land uses considered for those parcels are intended to be compatible with existing development.

Downtown Murrieta Specific Plan

LOCATION

The Downtown Murrieta Specific Plan Area is the historic core of the City. Bounded by Kalmia Street to the north, Ivy Street to the south, Hayes Avenue to the west and Jefferson Avenue to the east, the area encompasses approximately 252 acres.

BACKGROUND

The Historic Murrieta Specific Plan, predecessor to the Downtown Murrieta Specific Plan, was adopted in October 2000, amended in February 2003 and in March 2017, when it was renamed.

The area was originally part of Juan Murrieta's Rancho and was purchased by the Temecula Land and Water Company in 1884, when the land was subdivided into a variety of individual lots. Over the years, the land was developed with a range of residential and commercial uses. The predominant use in the area remained residential, with the majority of development activity occurring around Clay Street's Fountain House Hotel and the railroad station. Commercial development began to characterize Washington Avenue at the turn of the 20th century. Today, Washington Avenue and the entire Historic Murrieta are reminiscent of the City's past, with a mixture of historic commercial and residential buildings.

Today, the City has accomplished a number of goals for Historic Murrieta. A Civic Center, Police Station, Community Library and Senior Center are flourishing. Renewed pride, investment are evidenced by many new and successful businesses.

Los Alamos Hills

LOCATION

The Los Alamos Hills area is generally bounded by Clinton Keith Road on the north, Whitewood Road on the west, the Northstar Ranch and Hunter's Ridge developments on the south, and Winchester Road on the east.

BACKGROUND

The Los Alamos Hills area has an important history within the Murrieta community. It has long been a unique area in the City in which to live a rural lifestyle and enjoy the natural resources within the area. The eastern portion of the Los Alamos Hills area is located close to future Commercial and Business Park developments and Winchester Road. These uses are not entirely compatible with the existing rural lifestyle west of Warm Springs Creek, therefore, future land use transitions east of Warm Springs Creek may be considered. The Los Alamos Hills area has a variety of street classifications within and abutting its boundary, and is dependent upon small rural streets for internal circulation.

HISTORY OF LOS ALAMOS HILLS

Los Alamos Area During the Native American Period. Historic archaeological research suggests that the Murrieta-Temecula area has been occupied for perhaps thousands of years as evidenced by long-term prehistoric sites and carvings in local rocks and boulders. The Luiseño Peoples entered into the area sometime after 1500 and settled at various sites along streams throughout the area.

The Payomkawichum, as they were called prior to the Mission era, were a hunting and gathering people. Toatwi was a settlement located near Los Alamos Road and Winchester Road. Native Americans valued sites along streams and trails, as well as near large boulders and trees and atop hills such as the Hogbacks.

Los Alamos and the Early European Settlers. During the Spanish-Mexican period in the early 1800s, the area was used for cattle grazing in support of the missions at San Luis Rey and San Juan Capistrano. The Los Alamos Road was a likely route from the grasslands to the missions. The area later became part of the Rancho San Jacinto.

Following the gold rush, American and European settlers came into the area searching for mining claims, grazing land and homesteads. By 1883, the railroad made it possible to export grain and hay and more settlers arrived to plant nuts, olives, alfalfa, oats, wheat and barley.

Recent History of Los Alamos. The Los Alamos focus area contributed to the agricultural prosperity of the area, and got its name from the Los Alamos Road and Alamos School. This one-room school was built in the late 1890s, and taught farmers' children (and others) until 1969. The Alamos School has been relocated to Lake Skinner Regional Park and is now being used as a museum.

Los Alamos Road has a rural character in eastern Murrieta.

Los Alamos Road is the last rural road in Murrieta. For many years, Los Alamos Road unified the farm community and served families bringing their grains and produce to Winchester and the region. The original Los Alamos Road includes a portion renamed Thompson Road to honor the Thompson Family. Resources of historical significance in the Los Alamos focus area include the 19th century farmsteads - James Place, Hind Ranch and Garringer Place.

After the close of the railroad in 1935, the local land boom was over. Active agriculture production continued in the Los Alamos area through the 1950s. The last small-scale farming operation in the area was specialty seed production, which operated on the Gentry property until 2003.

3.4 KEY CONCEPTS FOR THE GENERAL PLAN

CITYWIDE BALANCE OF LAND USES

The City of Murrieta has experienced rapid growth with the majority of the growth being single family residential development. As a result of this growth, Murrieta is perceived as lacking an equitable distribution of residential, commercial, and public uses to provide convenient accessibility by all Murrieta residents.

The City seeks to provide an equitable and functional distribution of private and public enterprise including a range of housing types, access to retail and service uses, parks and civic facilities and local employment opportunities. To achieve this, the City seeks to provide for a more effective land use policy that expands and enhances community-wide access to jobs and services.

With considerable potential for growth due to available vacant land within the community, it is anticipated that Murrieta will continue to provide growth opportunities well into the future.

LAND USE AND TRANSPORTATION

With the implementation of the Global Warming Solutions Act of 2008 (AB 32) and SB 375, Murrieta is mandated by the State of California to address the linkages between land use, transportation and climate change. On a regional level, SB 375 will be implemented by the Southern California Association of Governments (SCAG) through the Sustainable Communities Strategy (SCS). On a local level, the City must examine the balance between land uses to meet the needs of a diverse community and examine opportunities to reduce vehicle miles traveled (VMT) and to increase access alternative transportation.

The Land Use Element provides opportunities to effectively designate land for retail and services that can be utilized by nearby residential uses. Additionally, employment-generating land uses provide opportunities for residents of Murrieta to work within the community where they live. Local access to jobs and services will also enhance the City's ability to effectively reduce vehicle miles traveled.

ECONOMIC DEVELOPMENT AND JOB CREATION

To support this priority during the 2011 General Plan Update, the City Council established a Comprehensive Development Strategy presenting a vision that Murrieta will be a diversified business hub for Southwest Riverside County and North San Diego County.

To achieve this vision, the City seeks to encourage private sector investment in the creation of higher paying jobs, income, and wealth through economic diversification. The City is focusing its efforts to attract a variety of businesses, higher educational institutions, and health care facilities. A full range of quality new development will be part of this effort, including retail centers, corporate/technology parks, hotels, and upscale restaurants.

Shown here under construction in 2010, Loma Linda University Medical Center-Murrieta is a catalyst for growth in the North Murrieta Business

The General Plan and particularly the Land Use Element, seeks to align City policy with this emphasis on economic development, by directing public investments in infrastructure and promoting the development of shovel-ready sites. It targets key locations for changes in land use and zoning that support the development of medical, educational, commercial, and business clusters. These key locations include the areas around Loma Linda University Medical Center-Murrieta and the Murrieta Education Center.

Economic development is strongly linked to two other major themes of the General Plan: sustainability, and becoming a healthy community. Commuting is one example of a connection between these themes. When there are more jobs available closer to home, Murrieta residents can reduce the amount of time that they spend commuting. This should reduce emissions from their cars, which benefits both the environment and human health. It would also provide residents with more time to spend in healthy activities with their families.

MIXED USE

The General Plan will include provisions that will allow the development of mixed use. “Mixed Use” involves greater use of developments that blend residential, commercial, industrial, or civic/institutional uses. By combining complementary uses, mixed use projects bring energy and vitality to areas during both daytime and after-work hours. Mixed use areas offer the opportunity for symbiotic developments that benefit both residents and the businesses operating within them. In addition, mixed use allows the advantage of flexibility of design to take full advantage of market shifts and land use trends. The General Plan will allow both vertical and horizontal mixed use.

TRANSIT AND TRANSIT-ORIENTED DEVELOPMENT

There is the potential for alternative transportation modes, including light rail and/or high speed rail, to have systems and potential stations in Murrieta in the future. The General Plan acknowledges this potential and intends to establish the policy framework should the systems and the potential for development around stations become a reality.

Transit-oriented development (TOD) or transit village is a district with frequent public transit, taller buildings, a mix of commercial and residential, and a lot of people walking. In a transit village decisions about density, building heights, street design, sidewalk widths, crosswalks, flow of traffic and parking are made with the intent of encouraging people to walk and use public transit rather than giving priority to cars. The basic idea behind a transit village is that for buses, light rail and subways to be convenient for riders, they must run frequently. In order to run

frequently, they need to have a lot of passengers going to the same place. Higher density areas have more destinations, drawing more passengers and therefore making more frequent transit economically feasible for the transit agency and more convenient for the people using it. A transit village is not a one-size-fits-all model for development, but rather a way of coordinating local land use and transportation planning to reinforce each other.

3.5 DESCRIPTION OF THE LAND USE PLAN

California State law requires General Plans to define land use designations, standards to measure density/intensity of land use, and provide a diagram to identify the physical location of each land use. The Land Use Plan is the primary guidance for implementing the General Plan through zoning. *Table 3-14*, *General Plan 2035 Land Use Distribution*, lists each general plan land use designation, the acreage of that use in the City, and the percentage of that use in the City.

Table 3-14
General Plan 2035 Land Use Distribution

Land Use Designation	Acres	Percent of City
Large Lot Residential	2,927.44	13.61%
Single-Family Residential	6,215.73	28.90%
Multiple-Family Residential	758.03	3.52%
Innovation	520.79	2.42%
Commercial	1,279.26	5.95%
Office and Research Park	516.91	2.40%
Business Park	717.35	3.33%
Industrial	185.47	0.86%
Civic and Institutional	1,064.81	4.95%
Parks and Open Space	3,824.14	17.78%
Mixed Use	59.68	0.28%
Roads	3,441.07	16.00%
TOTAL CITY ONLY	**21,510.68**	**100.00%**
Sphere of Influence[1]	5,340.95	
TOTAL WITH SPHERE OF INFLUENCE	**26,851.63**	

Notes:
[1] Sphere of Influence area is currently under County control and is provided in this table for illustrative purposes only.

MURRIETA GENERAL PLAN LAND USE DESIGNATION SYSTEM

The Land Use Element describes the intent, types, and amounts of future development that is envisioned in various locations throughout the City. The following section provides a description of each land use designation, as shown on *Exhibit 3-4*, *General Plan 2035 Land Use Policy Map*. Associated density/intensity standards and estimated buildout are provided in *Table 3-15*, *General Plan 2035 Land Use Summary*.

Residential Land Uses

Residential land uses are measured in terms of dwelling units per gross acre (du/ac). Dwelling units per gross acre define the maximum number of dwelling units that can occur on a parcel of land that is designated for residential use. The calculation of net dwelling units per acre can be determined through the application of site development and building development standards articulated in the Murrieta Development Code for all zoning classifications that are consistent with each Residential Designation described in the General Plan.

Non-Residential Land Uses

Non-Residential land uses are measured in terms of floor area ratio (FAR). FAR is the ratio between the net floor area of a building at the total area of the legal parcel upon which it is located. For example, a 43,560 net square foot building on a one acre lot (43,560 square feet) will result in a FAR of 1.0. FAR does not include the area within parking structures, access roadways, parking lots, or open space. Therefore, FAR is not an accurate measure of building height or site coverage, which is provided in the zoning standards for each zoning classification.

2035 PROJECTIONS

Table 3-15, *General Plan 2035 Land Use Summary*, presents a wider calculation of all acreage in the City and maximum potential growth for the different land use designations. The acreages of the various land uses on the General Plan 2035 Land Use Policy Map are presented, along with number of dwelling units and the amount of non-residential square footage. The values in *Table 3-15* account for buildout of any vacant or underutilized parcels and assume buildout of all land uses (as if all parcels had been developed to their maximum).

Table 3-15
General Plan 2035 Land Use Summary

Land Use Designation	Acres	Density Standard (du/ac)	Intensity Standard (FAR)	2035 Estimated Buildout	
				DU	SF
Large Lot Residential	2,927.44	0.4 - 1.0		908	
Single-Family Residential	6,215.73	1.1 - 10.0		30,146	
Multiple-Family Residential	758.03	10.1 – 30.0		14,115	
Innovation	520.79		0.6 - 2.5		7,259,396
Commercial	1,279.26		0.25 – 0.75	4	17,831,861
Office and Research Park	516.91		0.6 -2.5	20	6,079,482
Business Park	717.35		0.4 – 0.6		9,999,285
Industrial	185.47		0.4 – 0.5		2,585,303
Civic and Institutional	1,064.81		0.5 – 1.0		1,391,494
Parks and Open Space	3,824.14				16,508
Mixed Use	59.68	30.0	1	731	1,195,844
Roads	3,441.07				
TOTAL CITY ONLY	**21,510.68**			**45,923**	**46,359,173**
Sphere of Influence	5,340.95				
TOTAL WITH SPHERE OF INFLUENCE	**26,851.63**				

Notes:
This table summarizes the General Plan buildout. Buildout calculations described in this table are estimates. du/ac = dwelling units per acre. FAR = Floor Area Ratio.

RESIDENTIAL LAND USE DESIGNATIONS

The City of Murrieta provides a range of housing types to meet the varying needs of its residents. The following residential land use designations are established for the General Plan 2035.

- **Large Lot Residential (0.1 – 1.0 du/ac).** Large Lot Residential provides for very-low density residential development on land that may have limited access to urban services. Typical development consists of single-family detached housing and accessory buildings, often with the keeping of horses and other farm animals and/or small agricultural plantings.

- **Single-Family Residential (1.1 – 10.0 du/ac).** Single-Family Residential provides for traditional single-family detached and attached housing. Typical development consists of a single-family detached home for each legal lot. The Single-Family Residential designation also provides for small lot development such as zero lot line.

- **Multiple-Family Residential (10.1 - 30 du/ac).** Multiple-Family Residential provides for attached and detached apartments and condominiums. Typical development consists of townhomes, condominiums, apartments, senior housing, and stacked flats. Multiple-Family Residential encourages the development of integrated projects that provide complementary open spaces and amenities on-site.

Base Land Use Density

The base land use density refers to the maximum number of units per acre permitted under the corresponding zoning district. The base density for the Rural Residential category is 1 unit per acre. The base densities for the Single-Family Residential and Multiple-Family Residential categories are 10 units per acre and 30 units per acre, respectively.

Housing Affordability Bonus

The City provides for the development of affordable housing for lower-income households through its affordable housing density bonus program in accordance with State law. The specific provisions of the affordable housing density bonus program are outlined in the City's Development Code. When utilizing the affordable housing density bonus program, the allowable density is increased by up to 100 percent for senior housing and 35 percent for non-senior housing, consistent with State density bonus law, as amended.

NON-RESIDENTIAL LAND USE DESIGNATIONS

The City of Murrieta provides a range of non-residential land use designations to ensure the provision of a range of retail, civic, entertainment, service, industrial, and other job-creating land uses.

- **Commercial (0.25 – 0.75 FAR).** The Commercial designation provides for a broad mix of commercial retail, service, and office uses that serve the local and regional consumer. Typical uses include retail stores, personal services, restaurants, motor fuels, business offices, and lodging intended to meet the needs of city residents, travelers, and the daily employment population.

- **Office and Research Park (0.60 – 2.5 FAR).** The Office and Research Park designation provides for a variety of employment intensive uses such as business and medical offices, corporate headquarters, medical services, research and development, and technological advancement. Retail and service uses are limited to those that best meet the needs of the local businesses and their employees. Development will reflect the high freeway visibility of the areas and the appropriate buffering of adjacent residential areas.
- **Business Park (0.40 – 0.60 FAR).** The Business Park designation provides for employment uses, including office, research and development, educational facilities, and light manufacturing. Development should create a campus-like business or industrial park setting. Retail and service uses are typically limited to areas along major streets.

- **Innovation (0.6 – 2.5 FAR).** The Innovation designation provides for a wider variety and intensity of non-residential uses allowed elsewhere in the City with the goal of providing a cutting edge and campus-like mixed-use business setting. The Innovation designation provides for employment intensive uses such as business and medical offices, corporate headquarters, medical services, research and development, education, technological advancement, makers labs (such as people using digital tools to design new products), craftsman products (such as furniture and window design/construction), and hotels. The designation also provides for a limited amount of commercial uses for the sale of products made in facilities on-site and restaurants that support the employment and primary uses.

- **Industrial (0.40 – 0.50 FAR).** The Industrial designation provides for both indoor and outdoor employment intensive industrial uses, including product assembly, warehousing/distribution and manufacturing. The designation also provides for more intensive uses, some of which may introduce potential environmental impacts such as noise, dust and other nuisances. Impacts should be mitigated through site design and appropriate screening and buffering.

- **Civic and Institutional (0.5 – 1.0 FAR).** The Civic and Institutional designation provides for public and quasi-public uses such as hospitals, government offices, schools, museums, libraries, public safety facilities, water and sewer treatment plants, and publicly or privately owned places intended for public assembly.

MIXED USE LAND USE DESIGNATIONS

Mixed Use

This designation provides for a horizontal or vertical mix of residential and non-residential uses, and utilizes both residential density and non-residential intensity standards. Floor area ratios up to 1.0 are permitted and the base residential density is 30 units per acre.

These standards are intended to be applied separately from one another. In other words, a mixed-use designation that allows a base density of 30 du/ac and an intensity of 1.0 FAR allows for development of residential units at 30 du/ac on the same site with 1.0 FAR non-residential development. There is no equivalency calculation required.

OPEN SPACE AND RECREATION LAND USE DESIGNATIONS

The City of Murrieta provides for a variety of passive and active open space and recreational opportunities for its residents.

Parks and Open Space

The Parks and Open Space designation provides for public parks and recreational activities, private recreational facilities, and passive open space areas. The designation is intended to provide for the preservation of natural open spaces, protection of wildlife habitats, maintenance of natural and scenic resources, greenbelts, and protection from fire and other natural hazards. The designation includes facilities generally accessible to the public such as bicycle paths, pedestrian trails, swimming pools, golf courses, equestrian centers, playgrounds, picnic areas, and sports recreational facilities.

GENERAL PLAN AND ZONING CONSISTENCY

State law requires a General Plan's land use designations to be consistent with the implementing zoning. *Table 3-16*, *General Plan 2035 and Zoning Consistency*, provides a summary of the General Plan 2035 and the associated zoning classifications. The City of Murrieta Development Code and Official Zoning Map will provide zoning classifications and maps that are consistent with the land use designations described in this Element.

Table 3-16
General Plan 2035 and Zoning Consistency

General Plan Land Use	Density/Intensity Standard	Consistent Zoning Classifications[2]
Residential Land Use		
Large Lot Residential	0.1 - 1.0 du/ac	RR ER-1
Single-Family Residential	1.1 - 10.0 du/ac	ER-2 ER-3 SF-1 SF-2
Multiple-Family Residential	10.1 - 30 du/ac	MF-1 MF-2 MF-3
Non-Residential Land Use		
Commercial	0.25 - 0.75 FAR	NC CC RC
Office and Research Park	0.6 - 2.5 FAR	O ORP
Business Park	0.4 – 0.6 FAR	BP
Innovation	0.6 – 2.5 FAR	INN
Industrial	0.4 - 0.5 FAR	GI GI-A
Civic and Institutional	0.5 - 1.0 FAR	C & I
Other Land Use		
Mixed Use	1.0 FAR 30 du/ac	
Parks and Open Space	N/A	P & R O S
Sphere of Influence[1]	N/A	N/A

Notes:
[1] Sphere of Influence area is currently under County control and is provided in this table for illustrative purposes only.
[2] Zoning Classifications as defined in the City's Development Code. Refer to Chapter 16 of the Murrieta Municipal Code.

3.6 GOALS AND POLICIES

A variety of goals and policies have been established to guide the future development and redevelopment of the City of Murrieta, including those associated with the City's 10 Community Priorities described in this General Plan. The following Goals and Policies describe the general policies that will guide the implementation of the Land Use Policy Map, consistent with the density and intensity standards described in this Element. Additionally, the goals and policies described in this section supplement and reinforce goals and policies contained in other General Plan Elements and the City's Municipal Code..

BALANCING COMMUNITY CHANGE WITH THE EXISTING ENVIRONMENT

GOAL LU-1	**A complementary balance of land uses throughout the community that meets the needs of existing residents and businesses as well as anticipated growth and achieves the community's vision.**

POLICIES

LU-1.1 Identify appropriate locations for residential and non-residential development to accommodate growth through the year 2035 on the General Plan Land Use Policy Map (Exhibit 3-4).

LU-1.2 Ensure future development provides for a variety of commercial, industry, and housing that serve the spectrum of incomes within the region.

LU-1.3 Establish a range of residential density and non-residential intensities to encourage a wide range of development opportunities.

LU-1.4 Provide for the development of complementary land uses, such as open space, recreation, civic, and service uses for all future residential and non-residential development.

LU-1.5 Encourage a wide variety of retail and commercial services, such as restaurants, and cultural arts/entertainment, in appropriate locations.

LU-1.6 Promote future patterns of development and land use that reduce infrastructure construction costs and make better use of existing and planned public facilities.

LU-1.7 Ensure necessary capital improvements are in place prior to new development or completed concurrently.

LU-1.8 Ensure that fiscal impacts associated with growth and change are evaluated to ensure the City's ability to provide vital services is not compromised.

LU-1.9 Discourage lands designated for employment-generating uses to be converted to other uses without careful consideration of the overall economic strategy and the jobs-housing balance implications.

LU-1.10 Apply the following provisions when cases arise regarding the location of land use designation boundaries:

- Where land use designation boundaries follow street lines or other identifiable property or boundary lines, those lines shall be construed to be those of the land use designation boundary.
- Where land use designation boundaries are indicated within street lines or identifiable rights-of-way or creeks, the centerline there of shall be construed to be that of the land use designation boundary.

PRESERVATION OF RURAL COMMUNITY HERITAGE

GOAL LU-2 A community that preserves its rural characteristics in appropriate locations.

POLICIES

LU-2.1 Provide for the keeping of horses and other livestock, as well as farming or agricultural operations, on appropriate larger lot residential property to preserve the community's heritage.

LU-2.2 Encourage provisions for the stabling of horses, including as a commercial use, for citizens who are not able to keep horses at their residences.

NEIGHBORHOOD PRESERVATION

GOAL LU-3 **Stable, well-maintained residential neighborhoods in Murrieta.**

POLICIES

LU-3.1 Maintain and enhance the character of single-family residential neighborhoods.

LU-3.2 Protect residential areas from the effects of potentially incompatible uses. Where new commercial or industrial development is allowed adjacent to residentially zoned districts, establish and/or maintain standards for circulation, noise, setbacks, buffer areas, landscaping and architecture, which ensure compatibility between the uses.

LU-3.3 Assure that the type and intensity of land use shall be consistent with that of the immediate neighborhood.

LU-3.4 Strive to provide a diverse mix of housing types, along with uniformly high standards of residential property maintenance to preserve residents' real estate values and their high quality of life.

LU-3.5 Prohibit uses that lead to deterioration of residential neighborhoods, or adversely impact the safety or the residential character of a residential neighborhood.

RESIDENTIAL DEVELOPMENT

GOAL LU-4 **A housing stock that meets the diverse needs of Murrieta's existing and future residents.**

POLICIES

LU-4.1 Provide for housing opportunities that address the needs of those who currently live or desire to live in Murrieta.

LU-4.2 Monitor the housing needs of the existing and future labor force and engage the business community to attract employees and new businesses to Murrieta.

LU-4.3 Locate multiple-family housing adjacent to jobs, retail, schools, open space, public transportation, and transportation corridors.

HIGH QUALITY INDUSTRIAL AREAS

GOAL LU-5 **Promotion of quality industrial development that provides local employment opportunities.**

POLICIES

LU-5.1 Support redevelopment and transition of obsolete industrial and manufacturing sites for commercial, flex-tech, and/or mixed-use development, reflective of current market demand.

LU-5.2 Promote quality design and development practices that reduce environmental impacts.

LU-5.3 Monitor the appearance of industrial properties to prevent areas of decline by requiring improved maintenance or rehabilitation, as necessary.

GOAL LU-6 **Land use policy that encourages job retention and attraction.**

POLICIES

LU-6.1 Encourage flexibility in land use regulations to respond to requirements of new and emerging business and industry types.

LU-6.2 Ensure land use policy is supplemented by predictable land use regulations.

LU-6.3 Continue to implement a fast-track development program that streamlines land use approvals and the permit process for businesses that promote the City's economic goals and policies.

LU-6.4 Establish the North Murrieta Business Corridor as a regional center for medical services and research.

LU-6.5 Actively seek private sector investment of high quality job creators that support and enhance the Loma Linda University Medical Center, Kaiser Permanente, and Rady Children's Hospital.

LU-6.6 Support the future development and expansion of the Loma Linda University Medical Center campus.

LU-6.7 Encourage the development of "flex tech" uses in the Business Park and Industrial use areas.

LU-6.8 Update the Development Code to limit commercial uses in the Business Park and Industrial Use areas.

LU-6.9 Encourage the development of a job-creating center of office, research, technology, and commercial activity to complement the regional orientation of the land use plan for the area bounded by the I-15 and I-215 freeways and Murrieta Hot Springs Road.

LU-6.10 Encourage opportunities for retail, office, and research uses to complement and serve existing uses in the North Murrieta Business Corridor Focus Area.

LU-6.11 Revitalize private and public lands in need of redevelopment or those that are underdeveloped due to lack of public facilities and revitalization.

VITAL COMMERCIAL CENTERS

GOAL LU-7 Economically viable, vital, and attractive commercial centers throughout the City that serve the needs of the community.

POLICIES

LU-7.1 Work with property owners of vacant commercially zoned property to develop their sites into appropriate, economically viable projects.

LU-7.2 Encourage revitalization and enhancement of existing underperforming commercial areas through site planning and redevelopment to maximize use of existing development.

LU-7.3 Promote physical improvement of existing retail centers.

LU-7.4 Discourage the construction of marginal, disjointed strip center commercial development within the City.

LU-7.5 Provide convenient freeway access for regionally-serving commercial centers to attract a regional customer base.

LU-7.6 Focus commercial retail centers adjacent to major transportation corridors.

LU-7.7 Look for ways to provide incentives to encourage lot consolidation and parcel assemblage to provide expanded opportunities for coordinated commercial development.

LU-7.8 Encourage consolidation of parking and reciprocal access agreements between adjacent business and commercial center property owners.

LU-7.9 Encourage opportunities for complementary retail and service uses to serve local residents and the daytime employment population.

LU-7.10 Encourage a range of retail uses that serve local residents and the region.

MIXED USE AND TRANSIT-ORIENTED DEVELOPMENT

GOAL LU-8 A community that provides opportunities for mixed use and/or transit-oriented development.

POLICIES

LU-8.1 Encourage integrated development that incorporates a mix of uses (residential, commercial, office) in mixed use or transit-oriented development areas.

LU-8.2 Encourage workplace development in close proximity to residences in mixed use or transit-oriented development areas.

LU-8.3 Minimize the impacts of mixed use or transit-oriented development housing projects on single-family neighborhoods.

LU-8.4 Design mixed uses or transit-oriented development projects to:

- Create a pleasant walking environment to encourage pedestrian activity.
- Create lively streetscapes, interesting urban spaces, and attractive landscaping.
- Provide convenient shopping opportunities for residents close to their residence.
- Integrate with surrounding uses to become a part of the neighborhood rather than an isolated project.
- Use architectural elements or themes from the surrounding area, as appropriate.
- Provide appropriate transition between land use designations to minimize neighbor compatibility conflicts.

LU-8.5 Encourage the creation of multi-modal transit opportunities with a healthy mix of businesses, childcare, senior services, and housing.

LU-8.6 Encourage higher density residential, commercial, and employment development near a future Metrolink or High Speed Rail Station, along other major public transportation routes, and at other suitable locations.

LU-8.7 Amend the Development Code to implement mixed use zoning districts that provide development standards for mixed use development, which should address minimum density and intensity requirements; allowable uses; horizontal and/or vertical mix of uses, building heights; and parking standards.

LU-8.8 Evaluate mixed use projects to ensure that there is an adequate mix of uses on the site and in the area.

LU-8.9 Continue to support and actively participate with the High Speed Rail Authority to plan future high-speed rail service and to address urban design, noise, and compatibility issues around the proposed Murrieta station(s).

SUSTAINABLE AND HEALTHY LAND USE PATTERNS AND URBAN DESIGN

GOAL LU-9 Land use patterns and urban design that support healthy and sustainable lifestyles and businesses.

POLICIES

LU-9.1 Encourage human-scale urban design on the neighborhood, block, and building scale.

LU-9.2 Encourage active and inviting pedestrian-friendly street environments that include a variety of uses within commercial, mixed use or transit-oriented development areas.

LU-9.3 Encourage new neighborhoods to be built on a pedestrian-scale, within walking distance of parks, neighborhood-serving commercial areas, and other neighborhood amenities.

LU-9.4 Differentiate between areas zoned as neighborhood commercial and community commercial, encouraging unique, pedestrian-oriented, and neighborhood-serving uses in the neighborhood commercial zone.

LU-9.5 Promote commercial uses near residential neighborhoods that serve local residents and create neighborhood-gathering places.

LU-9.6 Provide pedestrian-oriented urban design through creative use of site development standards.

LU-9.7 Encourage development patterns to become more conducive to short, local, and walkable trips, which could increase opportunities for physical activity and decrease time spent driving.

LU-9.8 Consider infill locations for higher education facilities to capitalize upon existing or create synergies with surrounding uses.

LU-9.8 Ensure adequate buffers are provided between residential and non-residential uses.

GOAL LU-10 A community that provides pedestrian-friendly environments for residential, commercial, business, and recreation uses.

POLICIES

LU-10.1 Prepare and use design guidelines to encourage high-quality, pedestrian-oriented design that enhances the public realm.

LU-10.2 Consider preparation and adoption of a Street Master Plan that addresses walkability and streetscape.

LU-10.3 Consider that the development of new residential block lengths are no more than 800 feet on any one side, and no longer than 600 feet on average per side, creating a street network that enables multiple routes for pedestrians, cyclists, and vehicles through a neighborhood.

LU-10.4 Discourage physical barriers, such as arterial streets, transit or utility rights-of-way, or very long blocks without through-streets, between and within neighborhoods and neighborhood centers. If physical barriers are unavoidable, provide safe and comfortable crossings for pedestrians and cyclists.

LU-10.5 Update the Development Code to create walkability, and interesting and varied pedestrian environments.

LU-10.6 Encourage new businesses to have a pedestrian-accessible main entrance that faces the street, as appropriate.

LU-10.7 Encourage well-designed covered or structured parking instead of surface parking lots.

LU-10.8 Encourage new surface off-street parking to be located behind or to the side of buildings, as appropriate.

LU-10.9 Encourage ground-floor structured parking to be buffered from the pedestrian environment through strategies such as wrapping the structure with active retail uses, placing entrances off the street, and screening with landscaping or art.

COMMUNITY DESIGN

GOAL LU-11 **A community that is comprehensively designed to create a positive and distinctive City image by protecting historic resources, and by strengthening the positive qualities of the City's overall image and neighborhood identity.**

POLICIES

LU-11.1 Study and determine areas in the City where rural character can be created, enhanced, or preserved.

LU-11.2 Endeavor to establish distinctive themes and character for individual focus areas or other areas, as appropriate, within the community.

LU-11.3 Enhance the positive qualities that give residential, commercial, and industrial areas their unique identities, while also allowing flexibility for innovative design.

LU-11.4 Preserve the unique character and integrity of the City's traditional residential neighborhoods.

LU-11.5 Improve the appearance and function of regional commercial centers through improved site design, landscaping, and architectural integrity.

LU-11.6 Seek to create unique retail spaces that are architecturally rich, pedestrian friendly, culturally sensitive, and economically viable.

LU-11.7 Prepare and implement design guidelines for special districts or areas with unique character in the City of Murrieta, as appropriate.

LU-11.8 Develop a design palette for multiple-family and mixed use buildings.

LU-11.9 Ensure that the design of buildings in the North Murrieta Business Corridor help to create a distinctive and cohesive look to reinforce this Focus Area as a major gateway into the City.

LU-11.10 Ensure that the design of buildings in the South Murrieta Business Corridor help to create a distinctive and cohesive look to reinforce this Focus Area as a major gateway into the City.

LU-11.11 Ensure that uses are designed to reflect the natural topography.

LU-11.12 Ensure appropriate buffers are provided between Rural, Single-Family, and Multiple-Family Residential uses.

LU-11.13 Encourage Office and Research Park uses that are complementary to the Civic Center and the Downtown Murrieta Specific Plan.

FOCUS AREAS

GOAL LU-12 **A focused development and economic development strategy that emphasizes specialized land use policies within identified Focus Areas.**

POLICIES

LU-12.1 Provide for the highest level of retail and job-creating uses in areas adjacent to the I-15 and I-215 freeways. This includes the North Murrieta Business Corridor, Golden Triangle North (Central Murrieta), and South Murrieta Business Corridor Focus Areas.

LU-12.2 Allow for Office and Research Parks and Innovation developments of a more intense nature in terms of height than other areas of the City.

RURAL CHARACTER

GOAL LU-13 **West of Warm Springs Creek, preserve the historic rural character of the Los Alamos Hills area by maintaining its unique environment rural style with low-density development and small rural roads while preserving natural features.**

POLICIES

LU-13.1 Maintain the existing 2.5-acre minimum residential parcel size west of Warm Springs Creek.

LU-13.2 Establish development standards for all new construction to ensure high quality rural development in the area west of Warm Springs Creek.

LU-13.3 Establish unifying visual elements, such as split rail fencing, mature native trees, and well-spaced homes, as a means of distinguishing the Los Alamos Hills area as a rural historic enclave within Murrieta for the area west of Warm Springs Road.

LU-13.4 Encourage the construction of homes and accessory structures, west of Warm Springs Creek that are compatible with surrounding residential uses and the rural character of the Los Alamos Hills area.

LU-13.5 Consider Specific Plan land use regulations for the area west of Warm Springs Creek that allow the grouping of building sites on larger properties with steep terrain or other site constraints, while adhering to a maximum density of one dwelling unit per each 2.5 acres of lot area.

LU-13.6 Allow the keeping of personal livestock for both commercial and non-commercial purposes pursuant to the standards in the City's Development Code, and as may be modified through a Specific Plan.

LU-13.7 Allow commercial farms, tree crops and other agricultural uses on lots of at least 2.5 acres in size consistent with Los Alamos' long history as an agricultural community.

LU-13.8 Allow for the creation of entry monuments that are rural in character to announce the arrival into the Los Alamos Hills area.

LU-13.9 Discourage features such as small lots, conventional sidewalks, or conventional street lights, west of Warm Springs Creek.

LU-13.10 Encourage the minimal use of outdoor lighting to maintain the nighttime dark sky in the rural Los Alamos Hills area.

LU-13.11 Bring together the property owners in the Los Alamos Hills area to determine the land area to be included in a future Specific Plan.

LU-13.12 Bring together the property owners to develop a consensus-based Specific Plan.

LU-13.13 Encourage the Los Alamos Hills community groups, such as the Citizens for Quality of Life in Murrieta (CQLM), and property owners to work together with infrastructure providers and the City to identify infrastructure needs and costs, as well as financing options and timing for roads, road improvements, and water and sewer infrastructure, throughout the future Los Alamos Hills Specific Plan area.

LAND USE TRANSITIONS

GOAL LU-14 **Appropriate land use transitions between rural land uses west of Warm Springs Creek and more intense land uses east of Warm Springs Creek.**

POLICIES

LU-14.1 Consider the creation of a transitional density/intensity non-rural area to serve as a buffer area between the developments along Winchester Road and the rural residential land uses to the west of Warm Springs Creek.

NATURAL RESOURCES

GOAL LU-15 **Natural and visual resources are valued resources to maintain the rural character of the Los Alamos Hills.**

POLICIES

LU-15.1 Encourage the preservation of natural and visual resources within Los Alamos Hills, such as rock outcroppings and scenic views of the local hills and valleys, to the greatest degree practicable.

LU-15.2 Encourage new construction and landscape design that utilizes grading techniques to mimic the natural terrain.

LU-15.3 Encourage development that minimizes impacts to existing water courses, mature trees, and natural features as much as possible. In those cases that these areas/features are impacted, the final design should provide adequate mitigation on-site and/or in nearby areas.

LU-15.4 Encourage healthy and structurally sound, existing groves of eucalyptus and other mature non-native trees located west of Warm Springs Creek to be considered a visual asset to the area, and should be conserved and maintained to the maximum degree practicable.

LU-15.5 Encourage new development to replace or supplement with native tree species as opportunities arise.

LU-15.6 Encourage the development of an trail system within the Multiple Species Habitat Conservation Plan (MSHCP) and other open space areas that connects to a trails system within or adjacent to the existing and future street systems, including linkage through areas east of Warm Springs Creek (such as but not

limited to a transitional buffer area) to the open space corridor along Adobe Creek. Trails adjacent to streets should allow for multiple users and provide buffers between vehicles and trail users.

CIRCULATION

GOAL LU-16 **A circulation system that provides adequate access for all property owners in the Los Alamos Hills area.**

POLICIES

LU-16.1 Support the development of a circulation plan and road standards for the existing and proposed road system within the Los Alamos Hills area that reflects the land uses and development intensity within a Specific Plan.

LU-16.2 Explore the use of traffic calming measures, as appropriate.

DOWNTOWN MURRIETA SPECIFIC PLAN AREA

GOAL LU-17 **Historic Murrieta as the City's cultural, civic and community center.**

POLICIES

LU-17.1 Preserve and enhance the historic Murrieta area as the governmental and cultural focal point of the City.

LU-17.2 Continue the expansion of a traditional town development pattern with a grid street design and urban land use intensities to support a pedestrian-oriented environment.

LU-17.3 Encourage the location of civic, institutional, office uses, and other job-creating uses in downtown Murrieta. Supportive commercial activities and residential development should be encouraged.

LU-17.4 Encourage the development of community amenities such as libraries, museums, galleries, theaters, and other cultural activities within downtown Murrieta area.

LU-17.5 Encourage a broader mix of uses, including entertainment, along Washington Street, while maintaining the small-town character.

LU-17.6 Encourage mixed-use development projects within downtown Murrieta that create a pedestrian style living environment and encourage use of mass transit.

LU-17.7 Update the Downtown Murrieta Specific Plan as necessary to enable the area to serve its functional role, and to carry forward a program of infrastructure development.

INTERAGENCY COORDINATION

GOAL LU-18 Collaboration with Federal, State, County, and other regional agencies and authorities to ensure compliance with existing and future legislation that affects the City of Murrieta.

POLICIES

LU-18.1 Provide a strong role in the development of regional planning efforts by ensuring local land use issues are adequately addressed at the regional level.

LU-18.2 Establish a strong role in the implementation of Proposition 1A with the California High Speed Rail Authority (CHSRA).

LU-18.3 Continue coordination with the California Department of Transportation (Caltrans) related to the local impacts of change and development of the I-15 and I-215 Freeways as well as other local transportation routes and areas of influence under the jurisdiction of Caltrans.

LU-18.4 Continue coordination with the Riverside County Transportation Commission (RCTC) to ensure regional and sub-regional transportation efforts reflect Murrieta's unique attributes.

LU-18.5 Comply with procedures and programs of the County of Riverside and the Local Agency Formation Commission for future annexations.

LU-18.6 Consider the future annexation of the Sphere of Influence area.

LU-18.7 Seek out the formation of multi-jurisdictional partnerships with local, State, and Federal agencies and/or private interests. The City shall cooperate with the Riverside County Flood Control and Water Conservation District (RCFCWCD), Army Corps of Engineers, and the Riverside County Board of Supervisors in the development of waterways, tributaries, detention basins, and watershed management.

LU-18.8 Establish land use patterns that protect the public from impacts (noise, potential accidents) associated with the French Valley Airport, through the following:

- Consult with the Riverside County Airport Land Use Commission to ensure consistency with the scope and intent of the Airport Land Use Commission Law.
- Allow development in accordance with the Riverside County Airport Land Use Compatibility Plan and the French Valley Airport Compatibility Zones.
- Prohibit structures that are determined to be a "hazard" by the Federal Aviation Administration within the Riverside County Airport Land Use Compatibility Plan.
- Monitor legislation and regulations established by the Riverside County Airport Land Use Commission.

LU-18.9 Work closely with the Riverside County Airport Land Use Commission and other involved agencies in the development and review of the French Valley Airport Land Use Plan and other planning and environmental studies.

LU-18.10 Submit tentative tract maps and parcels maps to the Riverside County Airport Land Use Commission for consistency review. This is applicable to properties designated as Large Lot Residential and Single-Family Residential in the General Plan and that are located within Compatibility Zones C and D in the French Valley Airport Land Use Compatibility Plan.

LU-18.11 Submit commercial development and places of assembly to the Riverside County Airport Land Use Commission for consistency review with the applicable average and single-acre population intensity limits in the French Valley Airport Land Use Compatibility Plan for properties within Compatibility Zones B1, C, and D.

LU-18.12 Require new development in compatibility zones that is 10 acres or larger in area shall incorporate open space area in compliance with the Riverside County Airport Land Use Compatibility Plan Section 4.2.4 and in compliance with the applicable compatibility zones requirements in the French Valley Airport Land Use Compatibility Plan.

DEVELOPMENT IN ADJACENT JURISDICTIONS

GOAL LU-19 The City understands that development on lands adjacent to the City's corporate boundary can profoundly affect Murrieta residents and businesses.

POLICIES

LU-19.1 Cooperate with other jurisdictions in developing compatible land uses on lands adjacent to, or near, the City's corporate boundaries to minimize significant

impacts and potentially benefit residents, businesses, and/or infrastructure systems in Murrieta.

LU-19.2 Monitor planning and environmental assessments for development projects in adjacent jurisdictions and participate in public hearings for the projects.

CODE ENFORCEMENT

GOAL LU-20 The quality and character of the City is preserved and enhanced by compliance with relevant codes and regulations.

POLICIES

LU-20.1 Review the Development Code and determine which sections are outdated to meet current trends, regulations, adopted community visions, and the General Plan 2035 land use designations, and revise as necessary.

LU-20.2 Provide equitable, consistent, and effective code enforcement services that resolve complaints citywide, addressing quality of life issues that come from poorly maintained properties.

LU-20.3 Ensure adequate staffing for Code Enforcement to maintain and streamline enforcement efforts.

LU-20.4 Provide public education about property maintenance and Development Code requirements.

3.7 IMPLEMENTATION OF THE ELEMENT

Future development and redevelopment within Murrieta will primarily be guided by individual decisions by private property owners. In certain instances, implementation of the Land Use Element will require the coordination of federal, state and regional planning bodies. Water Management, Public Safety, Airport safety and other related planning considerations will require coordination and compliance with mandates established by other agencies.

The City's Development Code is the primary tool for implementing the General Plan, providing regulating standards, identification of permitted uses, and other regulations that support the proper implementation of the General Plan Land Use Element. The Development Code establishes and manages the use and design of future development by providing detailed descriptions for the use of property and site development standards (e.g., building heights and setbacks, parking standards, etc.) Subsequent to the adoption of the General Plan, the Development Code shall be amended to ensure consistency with the policies described in the Land Use Element.

Insert Exhibit 3-1 Specific Plan Areas

Insert Exhibit 3-2 French Valley Airport Compatibility Zones

Insert Exhibit 3-3 General Plan 2035 Focus Areas

Insert Exhibit 3-4 General Plan 2035 Land Use Policy Map

Chapter 4
Economic Development Element

4.1 INTRODUCTION

Economic development has been identified by City leaders as the key priority of the City and the focus for the General Plan 2035. The purpose of the Economic Development Element is to identify current economic development conditions and to demonstrate how the land use plan will promote business activity and employment growth within the City, consistent with the priorities identified by City leaders and the community. The Economic Development Element establishes goals and policies to promote fiscal stability, expand the City's employment base, and enhance the City's revenues in order to provide quality services to the community. These goals and policies provide for the implementation of the vision of Murrieta as a regional economic job center and premier commercial hub.
The following Community Priorities relate most directly to this Element:

- Pursue economic vitality and longevity by attracting higher education and growing a base of clean industry, while maintaining the current housing affordability.
- Create a vibrant, prosperous Historic Downtown that serves as a community center and provides a variety of quality shopping and dining experiences.

4.2 AUTHORITY FOR ELEMENT

The Economic Development Element is not a mandatory element required by State Planning Law. However, a General Plan may also include other topics of local interest, as chosen by the local jurisdiction. Murrieta has chosen to include an Economic Development Element to address the economic health of the City and to establish goals and policies that encourage economic growth while also maintaining and improving the quality of life in the community.

4.3 SETTING THE CONTEXT: KEY ISSUES AND CHALLENGES

There are key considerations and challenges facing Murrieta in regards to the current economic climate and the City's future economic development potential.

- **Existing Economic Climate.** Murrieta, along with other cities within California and across the United States, faced challenging times associated with the recent and prior economic downturn. Historically, Murrieta benefited from the housing boom preceding the downturn, which resulted in growth in household demand for local services and retail development. However, starting in 2006 residential activity began to dramatically decrease within Murrieta. The prior economic downturn resulted in a loss of jobs within the City, primarily concentrated in local serving sectors, such as retail, construction, and accommodation and food services. Although the climate has improved since the recent economic downturn, the City is still faced with the challenge of identifying new sources of growth that are more diversified and adaptable to recessionary pressures.

- **Regional Location.** Murrieta has an excellent regional location with the "center" of the City at the confluence of the I-15 and I-215 Freeways. This location provides opportunities for future rail transit, including High Speed Rail, that will serve broader destinations. The transit opportunities allow for transit-oriented development serving Western Riverside County. Along with affordable housing and attractive vacant land prices, Murrieta is well positioned to capture a competitive share of future regional economic growth.

- **Lack of High-Skilled Employment Opportunities.** Murrieta residents represent a highly skilled and educated workforce. However, local job opportunities within Murrieta do not adequately serve this workforce, resulting in high levels of out-commuting. The employment, labor, and commute data indicates that residents with higher education and occupational skills are largely commuting outside of the City for work. In comparison to other surrounding regions and communities, Murrieta has had a noticeably higher share of local-serving jobs. These jobs are typically categorized as lower to medium skilled. The concentration of local-serving jobs has resulted in lower average wages in Murrieta when compared to Southern California.

The creation of more high-skilled jobs is a community priority.

- **Retail Trends.** Murrieta's retail sales per capita is performing below the County of Riverside average and below the comparison with the subregional average. Murrieta's retail centers are generally comprised of community oriented, big-box centers. The City lacks a true regional shopping center. As a result, Murrieta is not capturing its fair share of household expenditures from within the City and its environs. This is particularly true for general merchandise and apparel. General merchandise, apparel, household furnishings and appliances and other specialty retail stores are key components of regional retail centers and have implications for the City's fiscal health given the importance of sales tax revenues. Further, per capita sales in eating and drinking places are also lower in Murrieta when compared to the subregion. The lack of restaurants, including higher-end restaurants was identified by the community as an opportunity. The City should also evaluate its long-term opportunities to capture a higher proportion of the automotive retail category in the future, notwithstanding the restructuring that is taking place in the automotive industry.

There may be opportunities for Murrieta to capture more automotive retail

- **Historic Downtown Murrieta.** Murrieta's Historic Downtown is a cherished and valued resource. It represents the original Murrieta Town site and continues to provide a home to some of Murrieta's oldest structures. Washington Avenue represents Historic Murrieta's traditional commercial street primarily within free-standing single-occupant buildings. The City's Town Center is also located within the Historic Downtown and includes City Hall, the Senior Center, Library, and Police Station, as well as Town Square Park. Historic Downtown Murrieta lacks the visibility of the major highways and corridors that serve other commercial centers, and the small lots limit the potential for larger commercial uses. Primarily developed with single-family residential uses, mixed use/higher density residential development is needed to support existing retailers and services and create market support for new commercial uses.

4.4 SETTING THE VISION: KEY CONCEPTS AND VISION FOR GENERAL PLAN

Opportunities for economic development are the key priority for the City. The following key concepts and vision for the General Plan directly guide the Economic Development goals and policies and are intended to respond to the key considerations and challenges identified above.

- **Regional Economic Growth.** The City has the potential to attract firms that offer relatively higher skilled and higher wage jobs due to its educated and skilled resident labor force, land use development opportunities, existing regional freeway accessibility, proximity to the French Valley Airport, and future transit development programs. Given that Murrieta has a significant share of residents with both higher education and higher skill levels, there is the potential for growth in the export-base industries, particularly within the manufacturing, research and development, professional, scientific and technical, information, medical, and finance and insurance sectors. There is also the potential for growth in the area of higher education, such as a four-year university in the City, as well as the industries that would benefit from proximity and access to higher educational institutions, which include the majority of industries cited in the previous sentence.

- **Office and Industrial Market Trends.** The City has the opportunity to capitalize on the growing lack of office space in North San Diego County and Orange County. As the Murrieta office market improves and evolves, it will attract a growing proportion of professional, medical, technical, and research employment, particularly in developments along major highway corridors and at the centrally located confluence of the I-15 and I-215 Freeways. Similarly, as the Murrieta industrial market improves, it will be well-positioned both geographically and demographically to attract a range of research and development (R&D) and light industrial users. The General Plan 2035 should create opportunities for flex-tech buildings and higher intensity office uses along freeway corridors.

The industrial base in Murrieta is positioned to grow with a range of R&D and light industrial businesses.

- **Retail Opportunities.** As the economy improves, Murrieta has the opportunity to expand its retail base to better serve the community and capture sales tax within the City. The General Plan 2035 should encourage opportunities to attract a regional shopping and entertainment center and a mix of moderate to higher end restaurants that

will allow residents, as well as visitors and employees, to shop and dine within Murrieta. Opportunities to capture a higher proportion of the automotive retail category in the future should also be pursued.

- **Historic Downtown Murrieta.** Demand for both local-serving and specialty retail goods and services within the Historic Downtown can be supported through infill and mixed use/higher density residential development along with the continued development of public uses within the Civic Center area. The General Plan 2035 should encourage opportunities to attract neighborhood level retailers and personal services providers that are compatible with and reinforce the historic and village atmosphere of the Historic Downtown. Higher-density residential and mixed-use developments should be evaluated and encouraged. Opportunities for redevelopment, including the use of redevelopment assistance and special housing and public improvement programs, where allowed, can be utilized to support new development and infrastructure improvements within the Historic Downtown.

4.5 GOALS AND POLICIES

GOAL ED-1 **A highly visible and attractive commercial/mixed-use regional hub located at the confluence of the I-15 and I-215 Freeways in central Murrieta.**

POLICIES

ED-1.1 Promote the City's location between two interstate freeways to create a regional hub of an intensity and scale commensurate with its regional orientation, high visibility, and gateway location.

ED-1.2 Encourage the development and integration of a mix of uses in a "main street" setting that includes retail anchored department stores, entertainment, hotel, office, retail, residential, and transit-oriented development and/or mixed uses that provide a regional draw.

ED-1.3 Encourage transit-oriented development within this area to support future transit opportunities.

GOAL ED-2 **A fiscally strong governance that meets the public service demands of residents and businesses.**

POLICIES

ED-2.1 Conduct thorough and frequent reviews of fiscal policy in order to maintain balanced tax and fee structures and to respond to changing fiscal policies at broader governmental levels.

ED-2.2 Improve the ongoing fiscal revenue and cost structure of the City, particularly revenue growth potential associated with hotel, retail, and restaurant land use development, business activities, and redevelopment/revitalization programs.

ED-2.3 Require fiscal impact analysis, as appropriate, for any development project requesting public funding, infrastructure participation, or revenue sharing.

ED-2.4 Actively seek to replace vacating businesses with users capable of generating similar or greater fiscal revenue streams.

ED-2.5 Review the City's fiscal revenue and cost structure on a periodic basis, using the established fiscal analysis framework, so that staff-level assessment can be provided in a quick, cost-effective, and accurate manner.

ED-2.6 Review city-sponsored programs and services to ensure that residents and businesses are provided high quality services in a cost-effective manner.

ED-2.7 Create a program that allows long-range public facilities financing for projects that provide economic and other benefits to the City; link capital improvements with General Plan priorities as part of the annual CIP process.

ED-2.8 Include a financing plan for infrastructure and related capital improvements for large-scale development projects that are consistent and coordinated with the City master plans.

ED-2.9 Maintain an updated system of development impact and processing fees and charges.

ED-2.10 Strive to limit the burden of taxes and special assessment on residential development to a maximum of 2.0 percent of the total assessed value in concert with other taxing entities.

GOAL ED-3 A sound, stable, and diversified economic base.

POLICIES

ED-3.1 Support a diverse range of business activities including professional/technical, information, technology-focused manufacturing, research and development, including medical research and research institutions, educational services, medical/health services, and financial services.

ED-3.2 Promote Murrieta as a center for medical/health services and technology through active encouragement and recruitment of medical office, medical research, and

health care facilities. around the Loma Linda University Medical Center, South Murrieta Business Corridor, and confluence of the I-15/I-215 Freeways.

ED-3.3 Create incentives to attract new businesses and industries that provide employment opportunities that match the education and occupational skill levels of Murrieta residents.

ED-3.4 Develop an economic base that attracts jobs and exports products and services by capitalizing on the City's strategic location and relatively lower land prices between greater Los Angeles/Orange County metro and San Diego market regions.

ED-3.5 Encourage companies that are involved in the manufacture of products for export, including international export, to invest and locate in the City.

ED-3.6 Encourage the development of technology incubators to promote entrepreneurship and support start-up companies.

ED-3.7 Work with area universities to promote technology start-ups and encourage technology transfer-related companies to locate within the City.

GOAL ED-4 Positive balance between the supply of retail opportunities and demand for goods and services.

POLICIES

ED-4.1 Encourage retail development projects that can realistically satisfy community-wide and regionally-based demand for goods and services.

ED-4.2 Encourage retail development, expansion, and remodeling projects that can effectively reverse or minimize outflows of local resident expenditures to retail facilities beyond the City limit.

ED-4.3 Support a concentration of retail centers in functional nodes at freeway intersection locations to maximize exposure and convenient access within the regional trade area environment.

ED-4.4 Support high-volume retail outlets along the Madison Avenue Corridor from Guava Street north to California Oaks/Kalmia Road, and on major intersecting streets.

ED-4.5 Create a unified urban design, marketing, and imaging strategy to strengthen the Madison Avenue commercial corridor.

ED-4.6 Encourage the development of a mix of moderate to high-end restaurants throughout the City, particularly in concert with business, entertainment, and cultural developments.

ED-4.7 As the economy improves, encourage continued development of a multi-dealer automotive sales center that satisfies regional demand for automotive purchases, captures sales tax, and takes advantage of the auto center's freeway exposure and access.

ED-4.8 Encourage retail developments to locate in areas where they can be most effective in terms of meeting the needs of local households and encourage mixed use, which can create neighborhood centers of activity.

ED-4.9 Allow retail development, in areas not currently designated for commercial land use by the General Plan, only after a thorough evaluation of their market potential for success.

GOAL ED-5 An improved jobs/housing balance.

POLICIES

ED-5.1 Encourage flex-tech buildings within business corridors and higher intensity office uses along freeway corridors with adequate visibility, convenient access, and future transit-oriented opportunities.

ED-5.2 Encourage the concentration of compatible employment-generating uses, such as professional office, research and development, and health-related services.

ED-5.3 Encourage a mix of housing types by price and rental ranges that are commensurate with the range of wage and household types attracted by a diversified economic base.

ED-5.4 Encourage housing that is within economic reach of all income levels and living styles inclusive of age-restricted housing, estate and ranch properties, single-family detached, single-family attached, town homes, condominium flats, and apartments.

GOAL ED-6 An educated and highly-skilled labor force.

POLICIES

ED-6.1 Encourage and support the development of institutions of higher education to serve educational pursuits of area residents and provide a highly skilled employment pool attractive to business investment and economic growth.

ED-6.2 Support the development of technical colleges and training institutions that build job skills commensurate with the growth of the economic base, particularly in the emerging health care services industry and the need for doctors, nurses, and other trained personnel.

ED-6.3 Coordinate and collaborate with the Murrieta Valley Unified School District, community colleges, and employers to develop specialized technical and vocational training programs to help match the skills of area residents with employer needs.

ED-6.4 Support professional development and continuing education programs so that working adults can expand their skills and embrace lifelong learning.

GOAL ED-7 Tourism and leisure opportunities that attract residents and visitors.

POLICIES

ED-7.1 Encourage the development of tourist and entertainment-type facilities such as hotels, dinner house restaurants, performing arts center, museums, a music and festival park, an amusement park, mineral hot springs, golf courses, and visitor information centers.

ED-7.2 Encourage the development of business-oriented hotels that capitalize on the superior freeway locations in Murrieta and the expanding office, professional and technical job base.

ED-7.3 Encourage development and business activities that capitalize on natural amenities and resources of the area such as trail and tour guides, campgrounds, rodeos, equestrian breeding and training farms, nature and open space preserves.

ED-7.4 Promote and encourage future development of a full-service resort that incorporates local amenities and attractions, such as the mineral hot springs and the nearby vineyards and wineries.

ED-7.5 Explore opportunities to capitalize on Murrieta's proximity to Temecula Valley wine country.

GOAL ED-8 Strategic approach to economic growth.

POLICIES

ED-8.1 Encourage and market to employers that provide employment opportunities commensurate with the education and skills of Murrieta residents.

ED-8.2 Support a business friendly environment for new businesses to locate in Murrieta and existing businesses to flourish.

ED-8.3 Formulate and implement strategies that are responsive to critical economic goals of the community and monitor and update these goals annually through the Economic Development Department.

ED-8.4 Explore opportunities for business assistance and incentive programs to attract businesses to the City.

ED-8.5 Establish a Business Retention and Expansion program that supports existing and future businesses.

ED-8.6 Establish a priority for implementation programs while maintaining flexibility to adjust to market-based conditions, as necessary; coordinate with General Plan priorities.

ED-8.7 Periodically assess the ability of the City to meet the growth needs of office and research and development firms.

ED-8.8 Maintain economic information and development opportunities on the City's website and creative interactive links with the real estate brokerage and development industry.

ED-8.9 Continue to work with the Murrieta Chamber of Commerce to promote the continued economic growth of the City and provide businesses with the tools and services to succeed.

ED-8.10 Continue to consult with technical networking organizations to market Murrieta and encourage new businesses and industries to locate in the City.

ED-8.11 Work with property owners to promote the vision of the community as a future job-rich center.

GOAL ED-9 A coordinated and stable regional economic environment.

POLICIES

ED-9.1 Coordinate implementation efforts with other economic development programs carried out by other implementation agencies including, but not limited to: Murrieta Housing Authority, Murrieta Chamber of Commerce, Temecula Chamber of Commerce, Riverside County Economic Development Agency, Western Riverside County Council of Governments, San Diego Association of Governments, San Diego North Economic Development Council, San Diego Regional Economic Development Corporation, Economic Development Coalition

Southwest California, and Southwest California Economic Development Corporation.

ED-9.2 Where possible, capitalize on economic development efforts already occurring within the region and maintain active economic development partnerships with other local and regional governments and agencies.

ED-9.3 Ensure that future annexations are fiscally and economically beneficial to the City and are accomplished through a coordinated effort between the City, LAFCO, and other interested agencies.

ED-9.4 Continue to partner with Temecula to market and promote the "Twin Cities" as a job center between the Los Angeles/Orange County and San Diego metro areas.

GOAL ED-10 A revitalized and economically stable Historic Downtown Murrieta.

POLICIES

ED-10.1 Encourage compatible economic development activities that support the historic nature and unique character of Historic Downtown Murrieta and strengthens its citywide and regional draw.

ED-10.2 Encourage the development of neighborhood level retail uses and personal services within Historic Downtown Murrieta that serve the surrounding residents and businesses.

ED-10.3 Provide opportunities for mixed-use commercial and residential development to render Historic Downtown Murrieta a commercially viable entity consistent with its functional scale.

ED-10.4 Complete development of a Civic Center complex within Historic Downtown Murrieta on the Town Square site.

ED-10.5 Consider opportunities for the development of higher-density and mixed-use residential uses to support commercial development within the Historic Downtown.

ED-10.6 Consider opportunities to incorporate entertainment and cultural/art venues and activities within Historic Downtown Murrieta.

ED-10.7 Utilize redevelopment assistance and special programs to attract retailers and encourage new mixed-use development within the area.

4.6 IMPLEMENTATION OF THE ELEMENT

Implementation of the Economic Development Element requires coordination between the City of Murrieta, adjacent and regional jurisdictions, and local businesses and residents. There are a number of activities that assist and contribute to the implementation of the Element. Murrieta recognizes that economic development is a challenge accepted by several local agencies and that the full scope of possible implementation approaches does not fall on any single entity. The City will implement the Economic Development Element through public/private actions and policies. A key component will be to establish priorities for policy implementation and monitoring the progress of the implementation. Overall, the City must maintain flexibility due to the dynamic nature of our market-based economy.

Chapter 5
Circulation Element

5.1 INTRODUCTION

The Circulation Element represents the City's overall transportation plan to accommodate the movement of people and goods within and through the City. It establishes goals and policies to achieve a balanced transportation system that adequately serves the growth and development anticipated in the Land Use Element. The transportation plan consists not only of the physical transportation system itself, such as streets, highways, bicycle routes, trails, and sidewalks, but also the various modes of transportation, such as cars, rail, buses, trucks (goods movement), bicycles, and walking. The Circulation Element acknowledges the heavy use of the road and highway system by single occupant automobiles and promotes efforts to provide additional transportation choices and to use the system more efficiently through increased transit use, carpooling, walking, and bicycling. The City's circulation system contributes to the form and character of the community by providing connections between neighborhoods and commercial corridors, providing an enhanced network of sidewalks and trails that take advantage of the natural environment and recreational opportunities, and providing a pedestrian-friendly streetscape environment that encourages people to walk.

The following Community Priorities relate most directly to this Element:

- Protect and foster a strong sense of community and safety, as well as the "small town" feeling.
- Improve roadway networks to reduce traffic and provide a citywide system of bicycle lanes and recreational trails that improve accessibility without a car.

5.2 AUTHORITY FOR ELEMENT

Government Code Section 65302 (b) requires that a General Plan include:

> *"A circulation element consisting of the general location and extent of existing and proposed major thoroughfares, transportation routes, terminals, and other local public utilities and facilities, all correlated with the land use element of the plan."*

5.3 SETTING THE VISION: KEY CONCEPTS AND VISION FOR GENERAL PLAN

MANAGEMENT OF TRAFFIC

A combination of transit-supportive land use planning and increased transit service can boost ridership.

One of the priorities of the Circulation Element is to coordinate the City's transportation system with the development identified on the Land Use Policy Map. A variety of options may be available to the City in order to maintain an efficient roadway system, including roadway and intersection improvements, traffic monitoring, and/or signal coordination. The City should consider the latest technologies and creative measures to provide an efficient roadway system. The overall management of the traffic system also needs to address transit, bicycles, and pedestrians in order to ensure the safe and efficient movement of all users. The Circulation Element supports a multi-modal transportation network and implementation of complete streets to provide sufficient mobility.

EXPANDED AND EFFICIENT TRANSPORTATION MODES

The Circulation Element promotes a balanced transportation system, encouraging the use of all alternative transportation modes. An opportunity for new and expanded modes of transportation within and around Murrieta is regional transit, such as Metrolink and High Speed Rail (HSR).

Plans for implementation of a High Speed Rail System in California are currently under development and are subject to change as efforts to plan and fund the system continue to evolve. This section documents the planning process at the time of preparation of this Circulation Element. The California High Speed Rail Authority is currently planning a statewide High Speed Rail System that would connect Sacramento, San Francisco, Los Angles, and San Diego as shown in *Exhibit 5-1, High Speed Rail*. The link between Los Angeles and San Diego that would potentially pass through the City of Murrieta is in Phase 2 of the project and is therefore expected to be built only after a San Francisco to Los Angeles segment is implemented. Current plans for the Los Angeles to San Diego (Southern California) Section of the High Speed Rail System are shown in *Exhibit 5-2, High Speed Rail, Southern California*. As shown in *Exhibit 5-2*, there are two options for location of a station in Murrieta, one along I-15 and one along I-215. Exact sites for the potential stations have not yet been selected.

Metrolink

Metrolink currently provides commuter service connecting Riverside County with downtown Los Angeles, Orange County, and other parts of Southern California. The closest Metrolink Station to Murrieta is located in South Perris along I-215 serving the SR 91/Perris Valley Line. The Riverside County Transportation Commission is preparing a Next Generation Rail Study and one of the options being considered is an extension of the SR 91/Perris Valley Metrolink Line to Murrieta and Temecula. The proposed extension is shown graphically on *Exhibit 5-3, Metrolink Extension*. The Metrolink extension project is one of many alternatives under consideration and the exact alignment, station locations, and funding sources remain to be determined. The introduction of regional commuter transit within the City could provide for the possibility of a multi-modal transit station with bus transit service and associated transit-oriented development.

Improved bus service throughout Murrieta, connecting with the greater region would also provide additional transit options for the community, reducing the use of personal automobiles. Potential improvements include additional bus routes and increased service frequencies connecting major nodes within the City. This is supported by the General Plan through increased coordination with transportation agencies and encouraging key development along the corridors, providing concentrated demand for transit services.

Recent technology advancements have led to the development of new and/or modified modes of transportation that have not been previously available. The General Plan supports the implementation of new transportation technologies and modes of transportation that can be demonstrated to provide safe and efficient travel alternatives. One example is on-demand shuttle service, which is a form of transit that offers rides at the request of travelers (similar to taxi or ride-hailing services), but at a reduced cost in smaller vehicles than traditional city buses. Travelers would typically share rides with other travelers with similar origins and destinations. This type of service has the potential to take the place of fixed-route transit service in a way that is more cost effective for both travelers and the service provider. On-demand shuttle services have been initiated in various communities in the country, including the local examples of the Carlsbad Connector in partnership between SANDAG and NCTD, OC Flex by the Orange

County Transportation Authority and SC Rides in the City of San Clemente in partnership with transportation network company Lyft.

A connected network of bicycle and pedestrian facilities will enable residents to travel without having to drive.

Connecting and enhancing the City's existing bicycle, pedestrian, and trails system is a key priority of the General Plan. An important component of facilitating this is through the creation and implementation of a master plan for non-motorized travel throughout the City, including multi-use trails, off-street paved bikeways, on-street bikeways, and related amenities. The Circulation Element identifies measures to implement bicycle and pedestrian networks in the City, allowing residents to travel from neighborhoods to key destinations without having to use their personal automobiles. The City's existing and proposed multi-purpose trails and bikeways are shown on *Exhibit 5-4*, *Trails and Bikeways*.

Crosswalk push button for pedestrian warning device

PROTECTION OF RESIDENTIAL NEIGHBORHOODS

The City strives to maintain an efficient and effective roadway system to limit incentives for traffic to divert through residential neighborhoods. In order to further protect these neighborhoods, the Circulation Element identifies measures that address the design of neighborhoods and traffic calming to reduce through traffic and traffic speeds. An option is to develop and implement Traffic Calming Guidelines along with the City's existing Neighborhood Traffic Management Program to address safety within residential neighborhoods.

Traffic calming design

TRUCK ROUTES

The designation of truck routes is intended to route truck traffic on City arterials so that trucks cause the least amount of neighborhood disruption. Roadways providing access to the freeways are those most likely to be designated for truck routes. The designated truck routes within the City are shown on *Exhibit 5-5*, *Potential Truck Routes*. These streets have been selected because of their accessibility to the freeway and key industrial/commercial areas. The designation of truck routes does not prevent trucks from using other roads or streets to make deliveries to individual addresses, or for other reasons as defined in the State of California *Motor Vehicle Code*.

5.4 DESCRIPTION OF THE CIRCULATION PLAN

Based on the passage of Senate Bill 743 (SB 743) in 2013 and its incorporation into the California Environmental Quality Act (CEQA) in 2018, vehicle miles traveled (VMT) will be the new performance measure recommended for the analysis of the transportation impacts under CEQA for both land development and transportation projects as of July 1, 2020. Minimization of VMT helps in reducing greenhouse gas emissions. Use of VMT as a performance measure for a transportation impact analysis also promotes multimodal transportation networks and infill developments. However, this modification in the determination of significant transportation impacts under CEQA does not change the need to analyze other performance measures related to the operation of the transportation system. For example, level of service (LOS) will continue to be a key performance measure used to analyze traffic congestion. The City's Traffic Impact Study Preparation Guide provides additional information related to the VMT and LOS performance measures and standards.

GENERAL PLAN 2035 BUILDOUT CIRCULATION MAP

Exhibit 5-6, *General Plan 2035 Circulation Map*, identifies the functional classifications of the roadways based on 2035 General Plan buildout conditions and *Exhibit 5-7*, *Typical Street Sections*, illustrates the street sections for the roadway types shown on *Exhibit 5-6*.

5.5 GOALS AND POLICIES

GOAL CIR-1 **A circulation system that serves the internal circulation needs of the City, while also addressing the inter-community or through travel needs.**

POLICIES

CIR-1.1 Ensure the transportation system can adequately serve the concentrations of population and employment activities identified by the Land Use Element.

CIR-1.2 Maintain a Level of Service "D" or better at all intersections during peak hours. Maintain a Level of Service "E" or better at freeway interchanges during peak hours.

CIR-1.3 Maintain an average daily traffic (ADT) Level of Service "C" or better for all roadway segments. As an exception, LOS "D" may be allowed in the North Murrieta Business Corridor, Clinton Keith/Mitchell, Golden Triangle North (Central Murrieta), South Murrieta Business Corridor, or the Multiple Use 3 Focus Areas, or other employment centers. LOS "D" may be allowed only at intersections of any combination of Secondary roadways, Major roadways, Urban Arterial roadways, Expressways, conventional state highways, or freeway ramps.

CIR-1.4 Continue to improve signal coordination and advanced traffic management systems at major intersections and along roadway corridors in order to optimize traffic flow through the City and reduce traffic queuing.

CIR-1.5 Maintain a set of street standards and require that all new road facilities be constructed or upgraded, where feasible, to meet City standards.

CIR-1.6 Coordinate with Caltrans to implement necessary improvements at intersections where the agencies have joint jurisdiction.

CIR-1.7 Evaluate the Circulation Element roadway plan on a regular basis using the City of Murrieta Traffic Model.

CIR-1.8 Identify and evaluate the major intersections requiring special design treatment to increase their vehicular capacity.

CIR-1.9 Provide a coordinated traffic control system that moves traffic within and through the City in an efficient and orderly manner. Upgrade systems as technology evolves.

CIR-1.10 Limit driveway and access on major arterial streets, where feasible, to maintain a desired quality of traffic flow.

CIR-1.11 Support the implementation of complete streets through a multi-modal transportation network that balances the needs of pedestrians, bicyclists, transit riders, mobility-challenged persons, older people, children, and vehicles while providing sufficient mobility and abundant access options for existing and future users of the street system.

CIR-1.12 Maintain an effective City truck route system to ensure that movement of truck traffic is accommodated by and confined to designated streets.

CIR-1.13 Work with adjacent communities and regional agencies to identify appropriate systems for goods movement.

CIR-1.14 Review current goods movement patterns and determine if possible restrictions on hours of truck traffic may reduce impacts to area streets.

GOAL CIR-2 A comprehensive circulation system that promotes safety.

POLICIES

CIR-2.1 Establish speed limits throughout the City that relate to the design and operating characteristics of roadways.

CIR-2.2 Maintain an ongoing maintenance program to ensure the safety of the City's roadway system.

CIR-2.3 Provide a circulation network that accommodates the safe and efficient movement of all forms of non-motorized travel.

CIR-2.4 Ensure roadway signage of adequate size to clearly convey street names or traffic control measures is installed and maintained.

CIR-2.5 Include paved shoulders on all roads in non-urban areas that can be used by cyclists and pedestrians.

CIR-2.6 Explore the use of traffic calming measures on streets with high incidences of speeding and/or history of collisions.

CIR-2.7 Publish and promote safe pedestrian and bike routes through creating an accurate citywide map and posting pedestrian/cyclist-scale wayfinding signage.

CIR-2.8 Encourage driveway consolidation and the use of shared driveways in commercial areas.

CIR-2.9 Ensure new roadways and intersections provide adequate sight distances for safe vehicular movement.

CIR-2.10 Review and comment on school district Environmental Impact Reports (EIRs) to ensure proposed school circulation systems address traffic and pedestrian safety within and adjacent to the site.

CIR-2.11 Work with the school districts to incorporate a Safe Routes to Schools program and establish a task force for school siting (including school closures) and safe routes decisions such as public works, city, county, Caltrans, law enforcement, school staff, public health, community groups and others.

CIR-2.12 Consider the development and implementation of Pedestrian Safety Guidelines that also include streetscape standards that emphasize pedestrian and cyclist safety (lighting, trees, greenery, traffic calming measures, etc.).

CIR-2.13 Work with the Murrieta Valley Unified School District and other local school districts, neighborhood associations, HOAs, and Parent Teacher Associations (PTAs) to facilitate the creation of “walking school buses,” “bike trains”, carpools and crossing guards for Murrieta schools.

CIR-2.14 Ensure that efficient and safe access for emergency vehicles is provided to all development.

GOAL CIR-3 Circulation systems that preserve the quality of residential neighborhoods.

POLICIES

CIR-3.1 Enforce speed limits and other regulatory signs in those areas defined by the California Vehicle Code as residential neighborhoods.

CIR-3.2 Review the design of all proposed new residential neighborhoods to ensure that “cut through” routes are minimized and pedestrian connections are maximized.

CIR-3.3 Discourage the flow of truck traffic and through traffic in residential neighborhoods.

CIR-3.4 Consider the development and implementation of Traffic Calming Guidelines to address safety within residential neighborhoods.

CIR-3.5 Continue to utilize the Neighborhood Traffic Management Program to provide all residential, commercial, and industrial properties sufficient and safe access for every vehicle.

CIR-3.6 Use cool pavement technology and reduce amount of paved surfaces when designing new roads, sidewalks, parking areas, and bikeways.

GOAL CIR-4 **Financing programs provide adequate funding for the City's roadway system.**

POLICIES

CIR-4.1 Identify and evaluate potential local revenue sources for financing roadway system development and improvement projects.

CIR-4.2 Pursue viable revenue sources to meet the roadway system funding needs from state, regional, and federal sources.

CIR-4.3 Pursue coordination of joint funding and development programs with adjacent cities and the County of Riverside for transportation related improvements in the Plan Area.

GOAL CIR-5 **A supported regional transportation system that serves existing and future travel between Murrieta and other population and employment centers within southwest Riverside County and the larger region, and that accommodates the regional travel needs of developing areas outside the City.**

POLICIES

CIR-5.1 Coordinate with appropriate jurisdictions and agencies to encourage the timely improvement of roadway and transit facilities that address area-wide and regional travel needs, including the State Transportation Improvement Program (STIP), the Riverside County Integrated Project (RCIP), and the Community and Environmental Transportation Acceptability Process (CETAP).

CIR-5.2 Coordinate with adjacent jurisdictions on regional transportation planning efforts.

CIR-5.3 Coordinate with the Cities of Temecula, Wildomar, and Lake Elsinore to pursue funding for and preparation of a transportation plan for the Jefferson Avenue Corridor.

CIR-5.4 Actively pursue the construction of the French Valley Parkway connector system, south of the I-15/1-215 confluence in cooperation with Caltrans, the City of Temecula, Riverside County, and local developers.

CIR-5.5 Actively pursue the construction of a new east-west corridor and interchange at Keller Road in cooperation with Caltrans, Riverside County, and local developers.

CIR-5.6 Actively pursue the improvements to existing interchanges within the City and construction of new over-crossings, as identified in the Capital Improvements Program, to achieve the adopted service level standards.

CIR-5.7 Support the addition of capacity improvements, such as high occupancy vehicle lanes, general purpose lanes, or auxiliary lanes on I-15 and 1-215.

CIR-5.8 Participate in programs to minimize regional traffic congestion.

CIR-5.9 Coordinate with Western Riverside Council of Governments, Riverside County, and Riverside County Transportation Commission to identify, protect, and pursue opportunities for public transit along major transportation corridors, and future high speed rail service, which connect Murrieta to other population centers.

CIR-5.10 Support the siting and development of a Metrolink Station(s) within Murrieta along the I-15 and/or I-215 corridors.

CIR-5.11 Coordinate with California High Speed Rail Authority, Riverside Transit Authority, and City of Temecula on the siting and development of a California High Speed Rail Intermodal Transit Center.

CIR-5.12 Continue to work with public transportation agencies to provide adequate levels of service to Murrieta citizens.

CIR-5.13 Coordinate with adjacent jurisdictions regarding the planning and coordination of circulation improvements in the Sphere of Influence area.

CIR-5.14 Encourage new large residential, commercial, or employment developments to locate on existing and planned transit routes.

GOAL CIR-6 Alternative travel modes and facilities are available to serve residents and employers/employees and reduce vehicle miles traveled.

POLICIES

CIR-6.1 Encourage alternatives to single-occupancy vehicle transportation such as rail, public transit, paratransit, walking, cycling, and ridesharing.

CIR-6.2 Support a variety of transit vehicle types and technologies to serve different transportation needs.

CIR-6.3 Work with the Riverside Transit Agency, Murrieta Chamber of Commerce, and/or the City's Economic Development Department to conduct a travel/commute survey with the intent of creating vanpools, carpools, and employment center shuttles to reduce single occupant vehicles.

CIR-6.4 Seek opportunities for funding that goes to support alternative forms of transportation.

CIR-6.5 Support the dedication and/or construction of appropriate facilities in support of a public transportation system.

CIR-6.6 Identify opportunities to implement the Western Riverside County Non-Motorized Transportation Plan within key activity centers of the City through the development of non-motorized transportation corridors and facilities (i.e., neighborhood electric vehicle routes, bikeways, pedestrian paths, sidewalks/paths).

CIR-6.7 Coordinate with the Riverside Transit Agency to provide fixed route transit service along transportation corridors connecting to employment and commercial areas, schools, health care facilities, and major recreation areas.

CIR-6.8 Support the construction of bus turnouts with shelters adjacent to new developments where transit demand levels may be sufficient in the future to warrant such accommodations to maintain traffic flow and provide safe loading/unloading for bus passengers.

CIR-6.9 Work with the Riverside Transit Agency to evaluate bus stops locations and amenities. Encourage the incorporation of transit amenities such as bus shelters and benches into existing and new bus stop locations.

CIR-6.10 Provide for express transit service through implementation of park-and-ride facilities along regional transportation corridors.

CIR-6.11 Encourage employer-based incentive programs for use of public transit and improve awareness of such programs.

CIR-6.12 Increase public education about public transit options.

CIR-6.13 Continue to require new development to submit a Trip Reduction Plan, if applicable, in compliance with the Transportation Demand Management Ordinance.

CIR-6.14 Encourage employers to provide employee incentives for utilizing alternatives to the automobile (i.e., carpools, vanpools, buses, flex time, telecommuting, bicycling, and walking, etc.).

CIR-6.15 Utilize vehicle miles traveled (VMT) as the performance measure to be used for CEQA transportation analyses conducted in the City in order to be consistent with SB 743. VMT will be the performance measure for both land development and transportation projects as of July 1, 2020.

GOAL CIR-7 **Residential areas and activity centers are accessible to all pedestrians, including persons with disabilities or having special accessibility needs.**

POLICIES

CIR-7.1 Encourage future developments to provide an internal system of sidewalks/pathways linking schools, shopping centers, and other public facilities with residences.

CIR-7.2 Require pedestrian access from the interior of new residential areas to public transit stops.

CIR-7.3 Encourage safe pedestrian walkways and ensure compliance with the Americans with Disabilities Act (ADA) requirements within all developments.

CIR-7.4 Consider the development and implementation of Pedestrian Friendly Street Standards.

CIR-7.5 Provide pedestrian amenities such as benches, trees, landscaping, and shade trees to encourage people to walk to destinations.

CIR-7.6 Promote improved demand responsive transit services for elderly and disabled persons.

CIR-7.7 Ensure visibility and access for pedestrians and encourage the removal of barriers (walls, fences) to allow for safe and convenient movement.

CIR-7.8 Work with Riverside County Transportation Commission, local retirement homes, the Senior Center, and other community groups to expand affordable and reliable transportation options for older adults and disabled persons.

CIR-7.9 Identify and map cooling centers in locations accessible to vulnerable populations and establish standardized temperature triggers for when they will be opened. Educate residents on heat-related risk and strategies to prevent heat-related illness.

GOAL CIR-8 **Development, expansion, and maintenance of a network of bicycle, pedestrian, and multi-use trails that allows residents to travel between parks, schools, neighborhoods, and other major destinations without driving.**

POLICIES

CIR-8.1 Create, update, and implement a master plan for non-motorized travel throughout the City, including multi-use trails, off-street paved bikeways, on-street bikeways, and related amenities.

CIR-8.2 Promote bicycle and pedestrian trails along major home to work and other travel routes.

CIR-8.3 Consider roadway design guidelines for new development and for capital improvement plans that enhance bicycle and pedestrian connectivity and safety.

CIR-8.4 Consider that 6- to 8-lane arterial roads provide a 5- to 6-foot-wide tree buffer (parkway) between pedestrians and through traffic.

CIR-8.5 Separate multi-use trails from roadways where feasible, or design multi-use trail crossing to occur at controlled intersections.

CIR-8.6 Establish guidelines for new development projects to include multi-use trails that connect to schools, parks, Historic Downtown, and other neighborhoods in the community.

CIR-8.7 Review and pursue opportunities to develop a trail head from the Murrieta Equestrian Park to the Santa Rosa Plateau and other adjacent areas.

CIR-8.8 When different uses are developed adjacent to each other – such as new commercial adjacent to new residential – require them to provide high-quality pedestrian amenities and connections between each other to the greatest degree possible.

CIR-8.9 Create cyclist and pedestrian connections through cul-de-sacs and across other barriers, connecting neighborhoods with each other and the citywide trail system. When feasible, consider purchasing easements across private land for priority pedestrian connections.

CIR-8.10 Work with adjacent property owners to create an interconnected trail that extends along the public right-of-way, which will benefit business by increasing exposure and access, and benefit the community through encouraging fitness, improved access, and a connected community.

CIR-8.11 Coordinate the location of multi-use trails to connect with regional trail systems, where feasible.

CIR-8.12 Pursue funding or grant opportunities to plan, construct, and maintain pedestrian, bicycle, and multi-use trails.

CIR-8.13 Maintain a map or maps of current bikeways and multi-use trails, and make the map(s) available to the public.

CIR-8.14 Partner with schools, employers, and community groups to teach bicycle and pedestrian safety in schools and workplaces and to educate residents about the benefits of walking and bicycling.

CIR-8.15 Consider changing the name of the "Traffic Commission" to the "Transportation Commission," and revise its scope to explicitly address all forms of transportation including automobile, bicycle, pedestrian, public transportation, and ADA enhancements.

GOAL CIR-9 An adequate supply of private off-street and public parking.

POLICIES

CIR-9.1 Ensure development projects comply with the parking requirements identified in the Development Code.

CIR-9.2 Encourage provision of joint-use and public parking facilities where needed by special assessment districts or other mechanisms.

CIR-9.3 Work cooperatively with developers and the business community to develop funding mechanisms for the construction of future parking facilities.

CIR-9.4 Consider reducing or waiving minimum parking requirements for development projects that implement Transportation Demand Management programs and/or are located near transit nodes.

CIR-9.5 Design dense nodes of commercial and retail businesses with no off-street parking that can be served by public parking garages so people can park once for multiple purposes.

CIR-9.6 Update the City's parking requirements in the Development Code to require bicycle parking and storage for all new development or redevelopment projects.

5.6 IMPLEMENTATION OF THE ELEMENT

Implementation of the Circulation Element involves several City departments including, but not limited to, Public Works & Engineering, Planning, and Community Services Departments. Traffic impact analysis requirements for individual development projects would continue to be used to effectively determine the operational effect of development projects on the circulation system and define appropriate improvements which adequately address project traffic increases. Continued maintenance and updates/refinements of inputs to the City's Buildout Traffic Model will allow the City to monitor the effect of on-going development approvals on ultimate circulation system needs. The City's Capital Improvement Program (CIP) will continue to be used to identify and plan for infrastructure improvements, including new or upgraded facilities and the maintenance of existing facilities.

There are a variety of funding sources and mechanisms the City would consider to fund infrastructure improvements including, but not limited to, Development Impact Fees, Transportation Uniform Mitigation Fee (TUMF), Redevelopment Agency Funds/Programs, and Grant Funds, as well as other State and County funding programs.

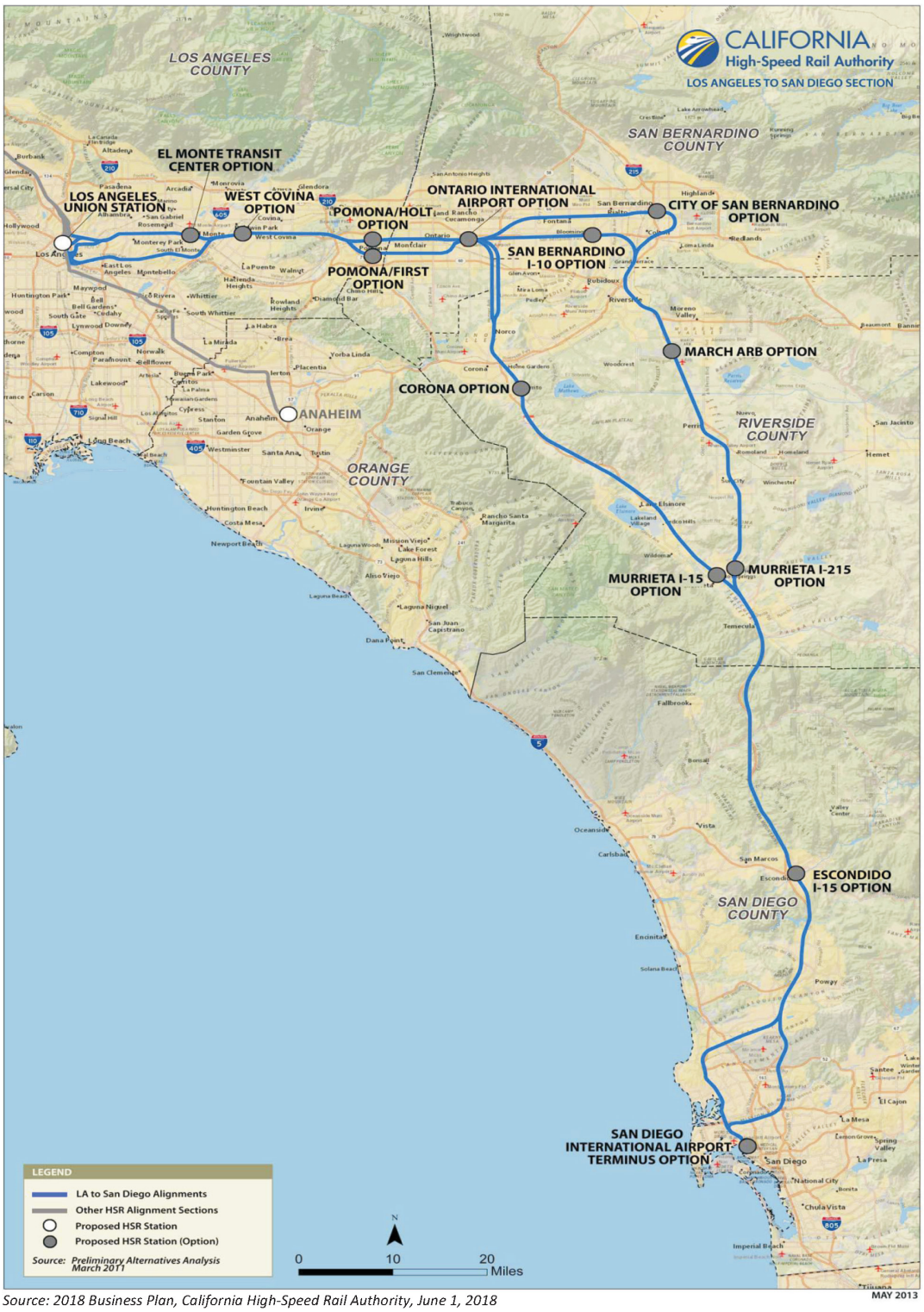
~~Insert~~ Exhibit 5-1, High Speed Rail

RICK ENGINEERING COMPANY

Proposed Statewide High Speed Rail Project

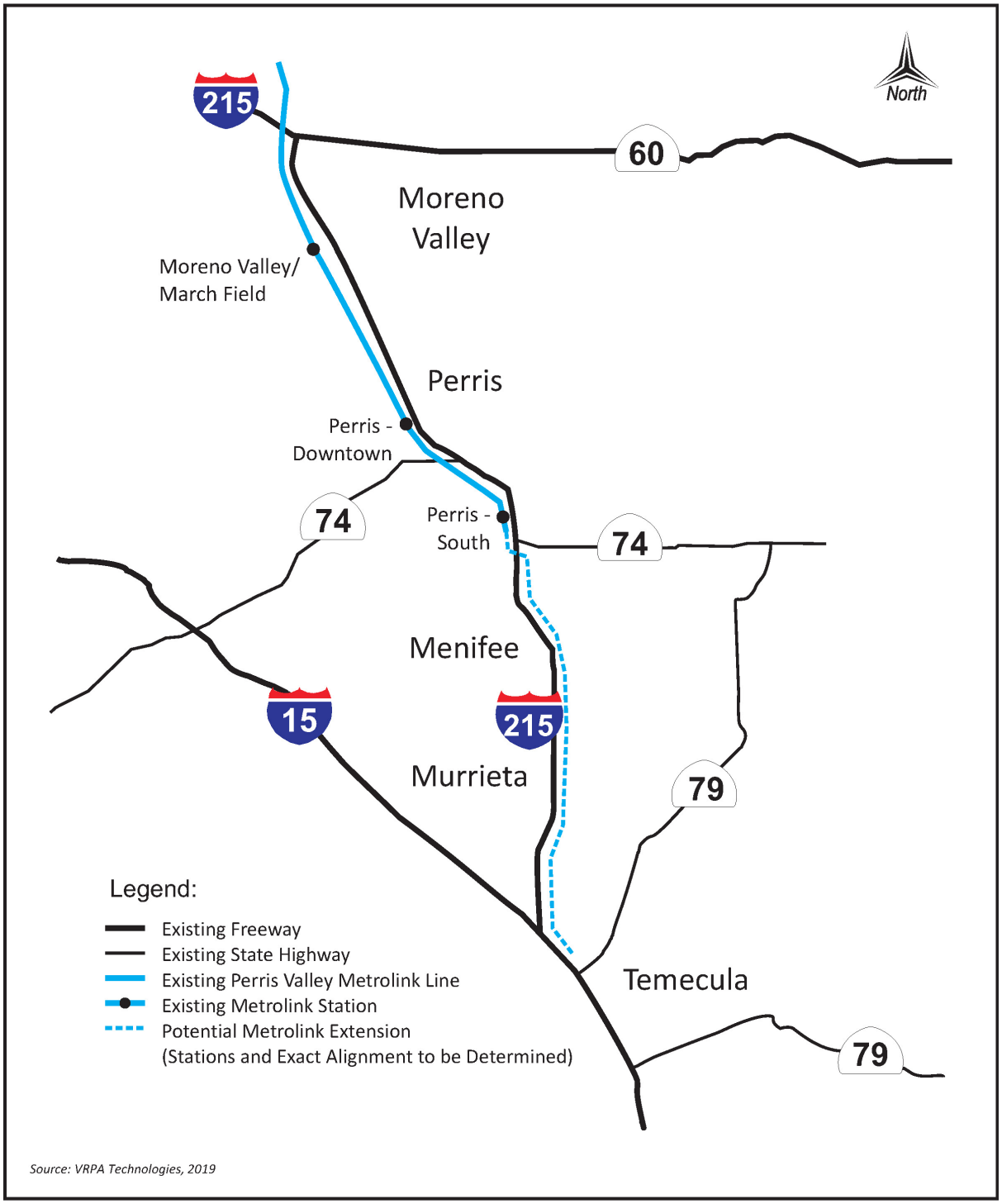
Exhibit 5-1

~~Insert~~ Exhibit 5-2, High Speed Rail, Southern California~~.~~



Source: 2018 Business Plan, California High-Speed Rail Authority, June 1, 2018

~~Insert~~ Exhibit 5-3, Metrolink Extension

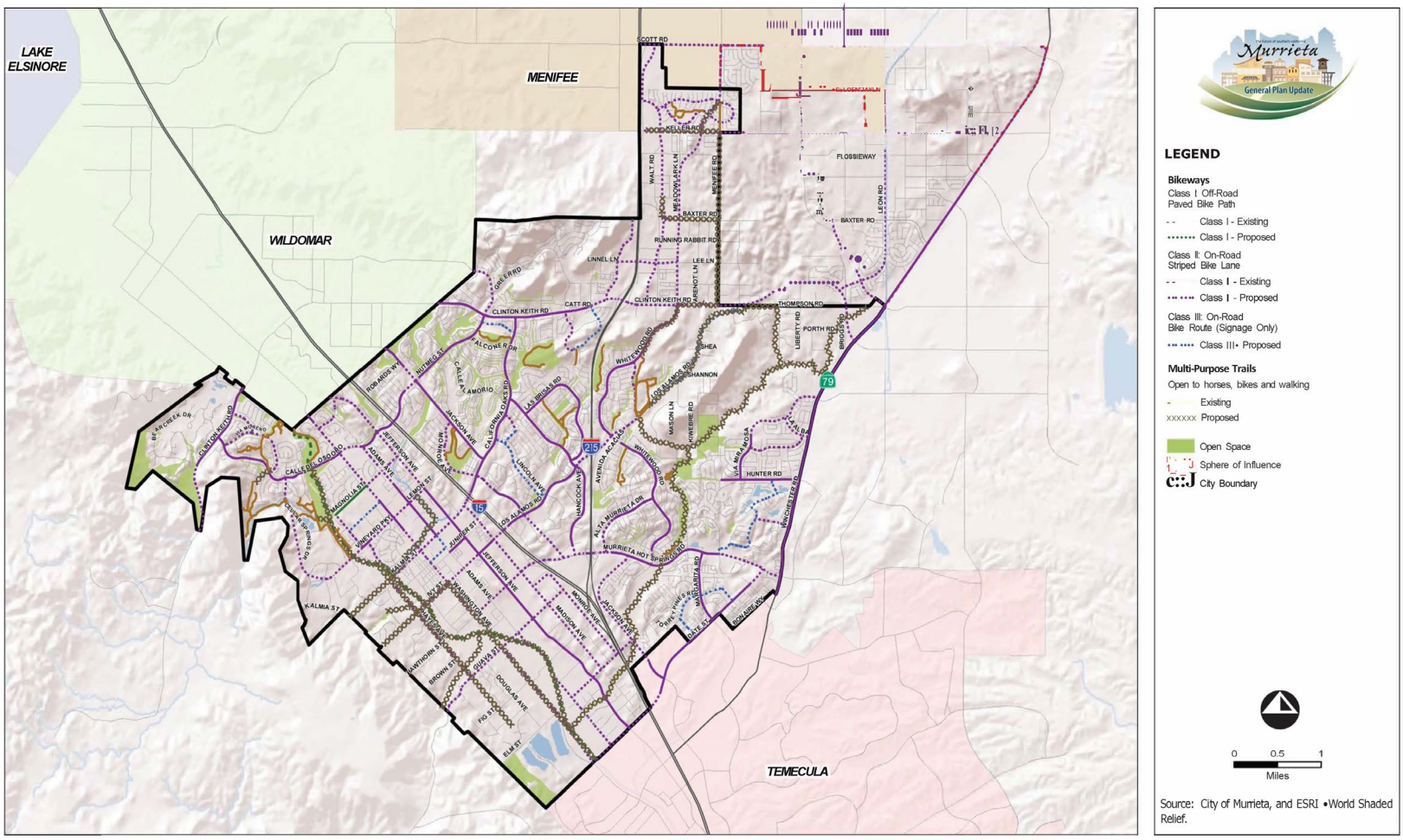


RICK ENGINEERING COMPANY

Potential Metrolink Perris Valley Line Extension to Murrieta/Temecula

Exhibit 5-3

~~Insert~~ Exhibit 5-4, Trails and Bikeways

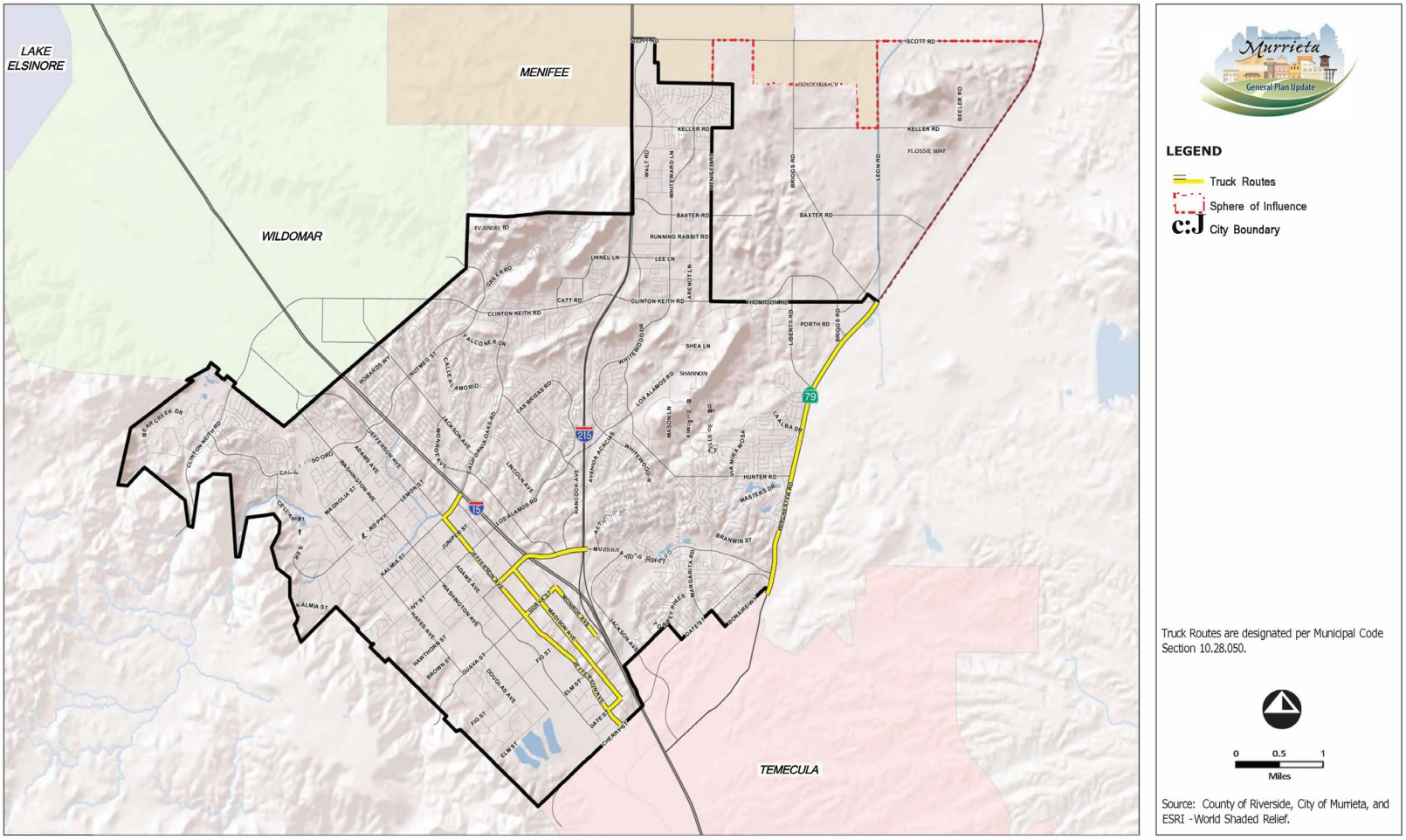


RBF CONSULTING

Trails and Bikeways

Exhibit 5-4

~~Insert~~ Exhibit 5-5, Potential Truck Routes



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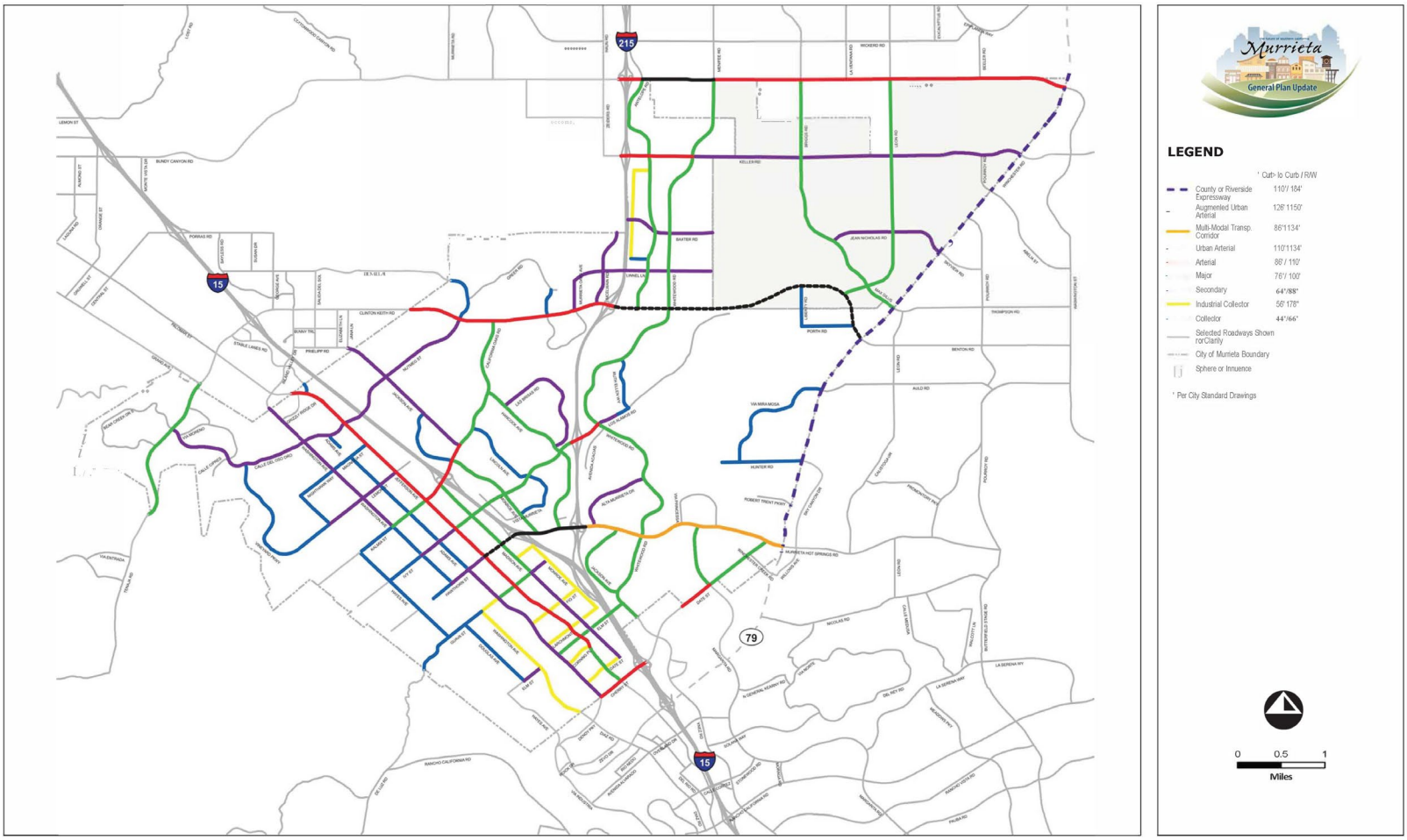
Potential Truck Routes

Exhibit 5-5

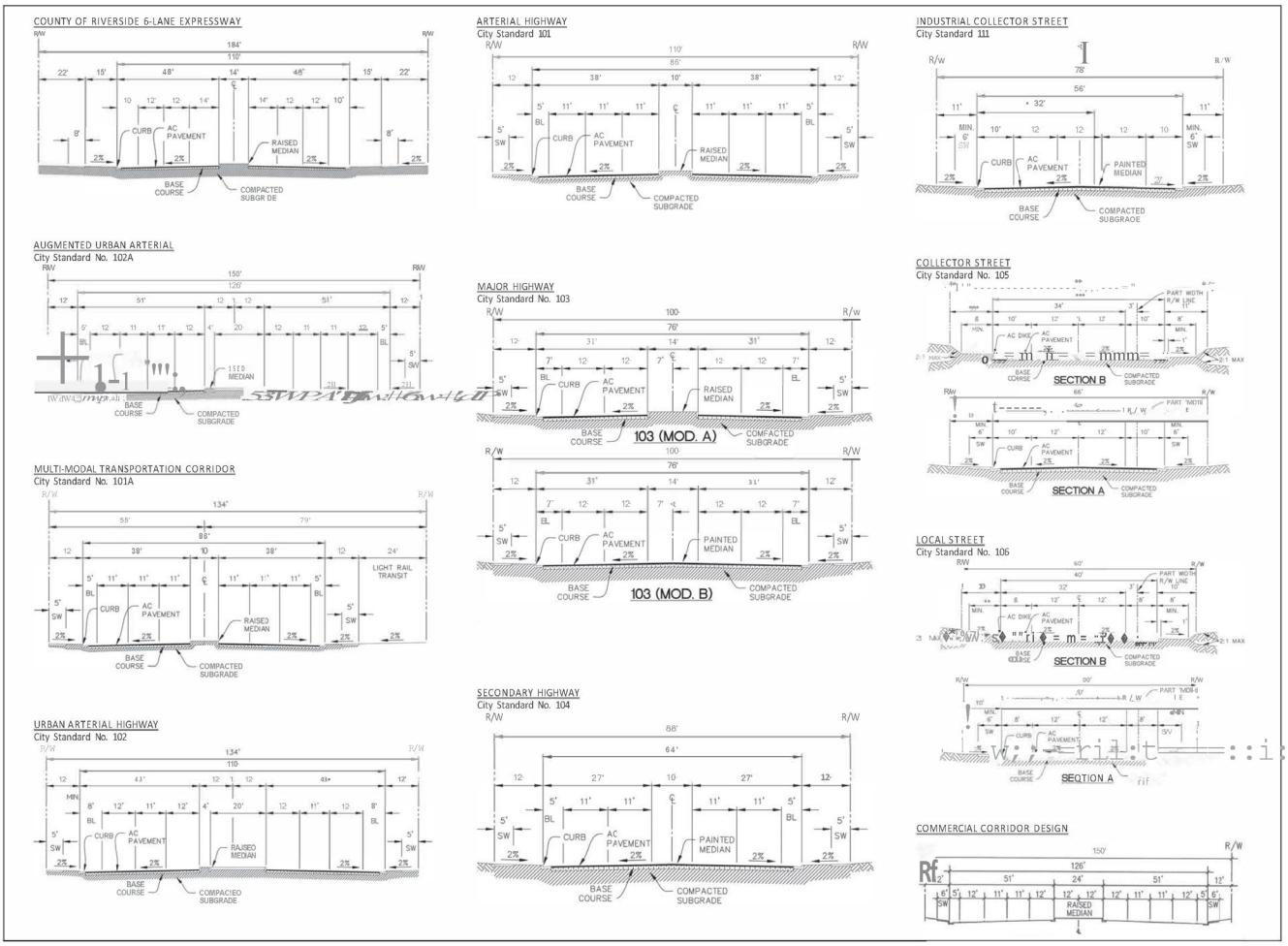
~~Insert~~ Exhibit 5-6, General Plan 2035 Circulation Map



General Plan 2035 Circulation Map

Exhibit 5-6

~~Insert~~ Exhibit 5-7, Typical Street Sections



STREET SECTIONS SHOWN

- County of Riverside 6-Lane Expressway
- Augmented Urban Arterial
- Multi-Modal Transportation Corridor
- Urban Arterial Highway
- Arterial Highway
- Major Highway
- Secondary Highway
- Industrial Collector Street
- Collector Street
- Local Street
- Commercial Corridor Design

Source: City of Murrieta, Department of Public Works, Standard Drawings, Section 100, Typical Street Sections, Ordinance No. 429-09, Effective January 14, 2010.

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Typical Street Sections

Exhibit 5-7

Chapter 6
Infrastructure Element

6.1 INTRODUCTION

In order to accommodate sustainable growth of Murrieta's resident population and employment centers, the City must actively plan for and allocate resources to infrastructure systems. This Element addresses Murrieta's facilities for water, wastewater, flood control, storm drainage, electricity and natural gas. It identifies infrastructure issues that affect General Plan implementation, seeking to ensure that adequate infrastructure is provided with all new development projects, and that infrastructure is maintained and upgraded as needed. This Element also seeks to encourage the expansion of recycled water systems throughout the City, as an important part of ensuring sufficient water supplies.

6.2 AUTHORITY FOR ELEMENT

California *Government Code* Section 65302 (b) requires that the General Plan include *"local public utilities and facilities, all correlated with the land use element of the plan."*

6.3 SETTING THE CONTEXT: KEY ISSUES AND CHALLENGES

WATER SUPPLY

The water supply in Murrieta comes from local sources of groundwater and surface water, imported water from the Metropolitan Water District's Colorado River Aqueduct and the State Water Project, recycled water reclamation facilities, and water transfers and exchanges.

Water is provided throughout most of the City by four water districts:

- Western Municipal Water District (WMWD)
- Eastern Municipal Water District (EMWD)
- Rancho California Water District (RCWD)
- Elsinore Valley Municipal Water District (EVMWD)

Their district boundaries are shown in *Exhibit 6-1*, *Water District Service Area Boundaries*. A portion of northeast Murrieta is not served by any water district, and residents in this area rely

on wells; this area is commonly referred to as the “keyhole.” Other, smaller areas throughout the City also lie outside the boundaries of all the water districts.

Due to the varied topography in Murrieta, providing sufficient water pressure can be a challenge. Each water district maintains multiple pressure zones in the City with pump stations and reservoirs. In some areas, such as the western edge of the WMWD area, private pumping systems may be necessary to maintain adequate pressures beyond the meter connection.

The water suppliers are planning to meet increased demand and reduce dependence on imported water. Their plans include water storage and groundwater recharge, treatment of wastewater to supply recycled water, and treatment of other non-potable water sources to increase potable water supply. Brief summaries of some of the districts’ plans are identified below:

- EMWD is seeking to increase water supplies through investment in facilities that treat wastewater, groundwater, and raw water from the State Water Project. In addition, EVMWD plans to increase its supplies of imported water and add wells.
- WMWD plans include developing additional storage and pipeline infrastructure, and seeking diversions from the Santa Ana River.
- RCWD plans to create additional wells and construct a facility to reduce the salinity of recycled water for agricultural use.
- Groundwater recharge is part of most plans to ensure future water supplies. RCWD plans to expand groundwater recharge in the Pauba Valley Basin. EVMWD has prepared a groundwater management plan for the Elsinore Basin to reduce overdraft and improve groundwater supply reliability, which includes replenishment. EMWD does not draw groundwater in the southern part of its service area, where Murrieta lies, but is involved in groundwater recharge in the San Jacinto Watershed.

All four water districts have adopted Urban Water Management Plans (UWMP), the purpose of which is to review current and future water resources, and to establish and maintain water conservation programs for a 25-year planning horizon.

WASTEWATER

Murrieta’s sewage (or wastewater) system consists of both public and private facilities. Developments located outside the public sewer system use on-site septic systems. Septic systems are regulated by the County of Riverside Department of Environmental Health.

Wastewater collection for the City and Sphere of Influence areas is provided by the same four water districts that provide potable water: WMWD, EMWD, RCWD, and EVMWD. Only RCWD and EMWD provide wastewater treatment; RCWD operates two water reclamation plants within the City of Murrieta. Wastewater flows from the other districts discharge into RCWD and EMWD interceptors for treatment.

With continued growth expected to increase demand for wastewater treatment, both EMWD and RCWD plan to expand the capacity of the treatment facilities serving Murrieta, which are respectively, the Temecula Valley Regional Water Reclamation Facility and the Santa Rosa Water Reclamation Facility.

RECYCLED WATER

Wastewater that has gone through tertiary-level treatment can be used as recycled water to irrigate crops and landscaping, so that potable water does not have to be used for these purposes. Water districts also use or plan to use recycled water to replenish groundwater and surface water sources. EMWD, RCWD, and EVMWD plan to expand their use of recycled water to boost water supplies.

EMWD operates a recycled water system, with costs and responsibilities shared through an agreement with RCWD and EVMWD. EMWD has a mandatory recycled water use ordinance requiring customers to use recycled water for appropriate permitted uses, when it is available. RCWD also operates a recycled water system and seeks to provide tertiary treated wastewater to golf courses and major park areas. Accordingly, RCWD non-domestic water mains provide recycled water to these types of uses in the northwest parts of Murrieta, including the Bear Creek and Colony Golf Courses.

Mains for recycled water run through Murrieta west of the I-15 Freeway, along Washington Avenue and Adams Avenue. Other mains exist south of the City boundary in Temecula, entering Murrieta along Winchester Road north of Robert Trent Jones Parkway; there are service connections in the neighborhood west of French Valley Airport.

STORM DRAINAGE

Storm water drainage infrastructure within the City consists of a network of natural and improved streams, storm channels, storm drains, and catch basins. Some regional master planned facilities over 36 inches in diameter are owned and maintained by the Riverside County Flood Control and Water Conservation District (RCFCWCD) with the remainder owned and maintained by the City when located within public right of way or easements, and all non-master planned facilities smaller than 36 inches in diameter are maintained by the City when located within public right of way or easements.

Storm water from the City and most of the Sphere of Influence that is not absorbed into the ground flows eventually to Murrieta Creek and its tributary Warm Springs Creek. Much of Murrieta Creek and sections along Warm Springs Creek lack formal flood control systems, and as a result drainage is haphazard in the less developed areas of the City, even with moderate rain. Murrieta Creek currently lacks the capacity to convey 100-year storm flows through the City.

A Master Drainage Plan prepared by RCFCWCD identifies improvements that would provide flood protection for both existing and future development within the City west of Interstate 15. The plan proposes improvements to Murrieta Creek eleven miles of earthen channel from Rancho California Road in Temecula to Clinton Keith Road in Wildomar, and a network of channels and underground storm drains. Many of the lines in the Murrieta Creek Drainage Plan have been constructed.

In addition, the U.S. Army Corps of Engineers and RCFCWCD are coordinating the Murrieta Creek Flood Control, Environmental Restoration and Recreation Project, along with the City of Murrieta and City of Temecula. This four-phase project includes channel improvements and a 250-acre detention basin with a natural riverine system. Besides providing flood protection, the detention basin is designed to improve groundwater recharge. Flood control is discussed more extensively in the Safety Element.

GROUNDWATER RECHARGE

Strategies for retaining storm water and allowing percolation not only reduce demand on flood control facilities, but have the added benefit of recharging groundwater, which is an important source of water for Murrieta. Groundwater recharge can be integrated into the design of development projects by preserving natural drainage courses, encouraging the use of pervious surfaces, and creating areas for water retention and infiltration. Recharge techniques that may be used on-site or off-site include recharge ponds, injection points, and storm water retention ponds.

ENERGY UTILITIES

Electricity and natural gas are provided by utilities that operate independently of the City. Any new developments must provide verification from the utilities that they are able to accommodate the additional demand for service. Besides facilitating the extension of energy services, the City can play a role in the supply of energy by promoting energy conservation and local installation of renewable energy systems.

Electricity

Electrical power is provided to Murrieta by the Southern California Edison Company (SCE). There are a total of six existing substations that service the area; three are located within the City limits. SCE maintains and operates the transmission and distribution infrastructure necessary to provide electricity to end users throughout its entire service area. SCE provides electricity to approximately 13 million people, 180 cities and communities in 50,000 square miles of service area, encompassing 11 counties in central, coastal and southern California.

A growing percentage of the energy supplied by SCE is from renewable sources: wind, geothermal, solar, biomass, and small hydroelectric.

Locally, SCE is in the process of developing the Triton transmission substation, a new 115/12 kilovolt substation that would serve the cities of Temecula, Murrieta, and unincorporated southwestern Riverside County. The substation would be located in the City of Temecula with the purpose of strengthening SCE's electrical network to maintain reliability and meet the area's forecasted electrical demands.

Wind turbines on residential lots can reduce household consumption of utility-supplied electricity. In order to promote the safe, effective, and efficient construction and use of non-commercial wind energy conversion systems on rural residential lots, the Murrieta City Council adopted Ordinance No. 408-08 establishing standards for these systems in the Rural Residential District.

Natural Gas

The City of Murrieta receives its natural gas service from the Southern California Gas Company (SCG), a subsidiary of Sempra Energy. Currently SCG is the nation's largest natural gas distribution utility, serving approximately 20.5 million customers throughout 20,000 square miles of central and southern California.

The City of Murrieta does not have any natural gas storage facilities. Natural gas is brought to the City through an existing network of gas transmission pipelines, and distributed through existing mains located under City streets, which can be extended to serve new projects.

In northeast and southwest areas of the City where natural gas infrastructure is not available, homes or businesses use propane gas. Individual propane tanks are located on the property and the owners or occupants execute private agreements with propane companies to maintain and refill the tanks.

6.4 SETTING THE VISION: KEY CONCEPTS AND VISION FOR GENERAL PLAN

There are close connections between Murrieta's water supply, wastewater, flood control, and storm drainage. Water used indoors becomes wastewater, while water used to irrigate landscaping may enter the storm drain system. Water conservation measures, therefore, reduce demand for water supply and also for infrastructure that handles wastewater and storm drainage. Conversely, storm water can become part of Murrieta's water supply if it is allowed to recharge groundwater aquifers. Wastewater that is treated is another important water source, whether provided directly through recycled water infrastructure or used to recharge aquifers. Finally, measures that improve groundwater recharge from storm water can reduce demand for flood control facilities while also boosting local water supplies.

Energy efficiency and local production of renewable energy not only reduce demand for energy supplied from outside the area, but fit into the City's overall efforts to promote environmental sustainability.

WATER SUPPLY

Water management will continue to be a challenging venture as the City grows and water supplies throughout California are tight. The City will support water district efforts to develop a more reliable, diverse, and sustainable portfolio of water supplies while also promoting water conservation and groundwater recharge. Related goals and policies are found in the Conservation Element.

The lack of water infrastructure in certain areas of the City, such as the northeastern portion, may be a limiting factor to future development. The City will encourage property owners to annex to water districts in these areas.

WASTEWATER

The City must continue to coordinate with the water districts to make sure new development does not exceed the capacity of wastewater conveyance and treatment facilities, and pays its fair share to increase capacity of those facilities. Water conservation will be a key factor in reducing the amount of wastewater generated per household. Further development in areas of the City where sewer infrastructure is not available may require additional alternative on-site water treatment systems. The City will encourage annexation to water districts in these areas for wastewater facilities.

RECYCLED WATER

Increased use of recycled water for irrigation and other appropriate uses is essential to reduce the demand for potable water. Interagency coordination among the water districts will continue to be important as they upgrade facilities for water treatment and expand distribution systems. The City will support the water districts in their efforts to promote the use of recycled water, and to expand recycled water facilities throughout the City.

STORM DRAINAGE

New development will add impervious surfaces and irrigated areas within the Murrieta Creek drainage basin. To minimize surface water runoff and nuisance flows to storm drains, the City will encourage new development to incorporate Low Impact Development (LID) strategies and landscape design that minimizes the need for irrigation. Related goals and policies are found in the Conservation Element.

To accommodate new growth and revitalization, the City and the Riverside County Flood Control and Water Conservation District should continue to maintain and replace aging storm drain systems and minimize the adverse effects of urbanization upon drainage and flood control facilities. Additional information regarding flooding can be found in the Safety Element.

When it rains, pollutants such as trash, litter, silt, automotive chemicals, animal waste, and other contaminants are washed into the storm drains. The Federal Pollution Control Act prohibits the discharge of any pollutant into navigable waters from a point source unless the discharge is

authorized by a National Pollutant Discharge Elimination System (NPDES) permit. The City of Murrieta participants in the NPDES permit program through a partnership with County of Riverside, all cities within Riverside County, and the Riverside County Flood Control and Water Conservation District.

The City will continue to coordinate with the Riverside County Flood Control and Water Conservation District to provide for drainage and flood control infrastructure. Impact fees for the construction and maintenance of storm drains will be critical to ensuring that adequate capacity is achieved for the 100-year storm.

GROUNDWATER RECHARGE

The City will promote Low Impact Development and other techniques for groundwater recharge in new developments. Whenever possible, the natural function of creeks and other drainage courses will be preserved when this does not interfere with flood control. Murrieta will also continue collaborative efforts to secure funding for completion of the Murrieta Creek Flood Control, Environmental Restoration and Recreation Project. Related goals and policies are found in the Conservation Element.

ENERGY UTILITIES

The City of Murrieta is dedicated to using energy more efficiently in its municipal operations, as well as promoting energy efficiency and renewable energy production throughout the community. Installations of photovoltaic solar panels and non-commercial wind turbines will be encouraged. Related goals and policies are found in the Conservation Element.

6.5 GOALS AND POLICIES

COORDINATED INFRASTRUCTURE

GOAL INF-1	**New development and redevelopment is coordinated with the provision of adequate infrastructure for water, sewer, storm water, and energy.**

POLICIES

INF-1.1 Encourage future development to occur in areas where infrastructure for water, sewer, and storm water can most efficiently be provided.

INF-1.2 Discourage development in areas without connections to existing infrastructure, unless infrastructure is being provided.

INF-1.3 Encourage the annexation of unserved areas into water district service areas.

INF-1.4 Ensure that new development and redevelopment provides infrastructure for water, sewer, and storm water that adequately serves the proposed uses, and that has been coordinated with affected infrastructure providers.

INF-1.5 Continue to require new development and redevelopment to provide verification that energy utilities are able to accommodate the additional demand for service.

INF-1.6 Provide information to water districts, Riverside County Flood Control and Water Conservation District (RCFCWCD), and energy utilities in their planning efforts to ensure adequate infrastructure is available for anticipated development.

INF-1.7 Encourage the preparation and updates of master plans by the appropriate providers or agencies to conduct detailed long-range planning to ensure the efficient provision of public services, infrastructure, and/or utilities.

INF-1.8 Consult with water districts and Riverside County Flood Control and Water Conservation District (RCFCWCD) to ensure that fee structures are sufficient for new development and redevelopment to pay its fair share of the cost of infrastructure improvements for water, sewer, and storm water.

INF-1.9 Encourage the water districts to proactively manage their assets through the maintenance, improvement, and replacement of aging water and wastewater systems to ensure the provision of these services to all areas of the community.

INF-1.10 Encourage the water districts to improve water and wastewater services in a way that respects the natural environment.

INF-1.11 Ensure sufficient levels of storm drainage service are provided to protect the community from flood hazards and minimize the discharge of materials into the storm drain system that are toxic or which would obstruct flows.

INF-1.12 When managed by the City, continue to maintain and replace aging storm drain systems to ensure the provision of these services to all areas of the community.

INF-1.13 Cooperate in regional programs to implement the National Pollutant Discharge Elimination System program.

INF-1.14 Continue to participate with other agencies on public education and outreach materials for countywide distribution to focus on public education and business activities with the potential to pollute. Distribute Best Management Practices (BMP) guidance for business activities, including but not limited to, mobile detailing, pool maintenance, restaurant cleaning operations, and automotive service centers.

INF-1.15 Continue to implement the City's residential informational and outreach program by providing homeowners with Best Management Practices (BMP) for activities such as, but not limited to:

- Disposal of fats, oils, and grease
- Disposal of garden waste
- Disposal of household hazardous waste
- Disposal of pet waste
- Garden care and maintenance
- Vehicular repair and maintenance
- Vehicular washing

INF-1.16 Continue to annually report the City's activities as part of its submittal to the San Diego Region Water Quality Control Board. Activities the City should report on include, but are not limited to:

- Litter Control
- Solid Waste Collection/Recycling
- Drainage Facility Maintenance
- Catch Basin Stenciling
- Street Sweeping

INF-1.17 Consider incorporating water quality features into new or redevelopment projects with sufficient land area. These features could address both project-specific and other local impacts.

INF-1.18 Minimize the adverse effects of urbanization upon drainage and flood control facilities.

INF-1.19 Encourage the City and the Riverside County Flood Control and Water Conservation District improve the storm drain system in a way that respects the environment.

INF-1.20 When considering development and City annexations, include assessment of all impacts to public facilities, services, and infrastructure, and identify any necessary mitigation.

INF-1.21 Encourage the use of specific plans, development agreements, or mechanisms that specify the nature, timing, cost, and financing mechanisms to be used to fund water, wastewater, and/or storm drainage improvements and services.

INF-1.22 Work with property owners to establish a financing mechanism, such as financing districts, to provide infrastructure and maintenance in major employment locations and corridors, such as the North Murrieta Business Corridor, South Murrieta Business Corridor, and at the confluence of the I-15 and I-215 Freeways.

INF-1.23 Utilize, where appropriate, public financing mechanisms, such as special assessment or community facilities districts to improve existing infrastructure or to install infrastructure in needed areas/or areas to stimulate development.

RECYCLED WATER

GOAL INF-2 Infrastructure for recycled water is expanded throughout Murrieta for irrigation and other non-potable uses.

POLICIES

INF-2.1 Support water district efforts to promote the use of recycled water where infrastructure is available, and to expand infrastructure where it does not currently exist.

INF-2.2 Work with the water districts to explore options for expanding recycled water pipelines to serve City parks and facilities that are near existing infrastructure, such as California Oaks Sports Park and Town Square.

INF-2.3 Continue to require installation of recycled water systems for landscaping, unless there is an exemption from the applicable water district.

INF-2.4 Encourage other major users of irrigation, such as schools and private golf courses, to connect to nearby recycled water pipelines.

INF-2.5 Coordinate with water districts to encourage innovative demonstrations of non-potable uses for recycled water and/or groundwater recharge in City facilities and industrial applications.

Refer to related goals and policies in the Conservation Element: Goal CSV-3 and Policies CSV-3.1 through CSV-3.5, and Goal CSV-4 and Policies CSV-4.1 through CSV-4.7 address storm water management and groundwater recharge.

CAPITAL IMPROVEMENT PROGRAM

GOAL INF-3 A satisfactory Capital Improvement Program.

POLICIES

INF-3.1 Ensure that the Capital Improvement Program (CIP) meets the City's needs.

INF-3.2 Ensure that the Capital Improvement Program (CIP) meets Measure A, or other appropriate local, regional, or State, requirements.

INF-3.3 Amend as necessary and adopt a Capital Improvement Program.

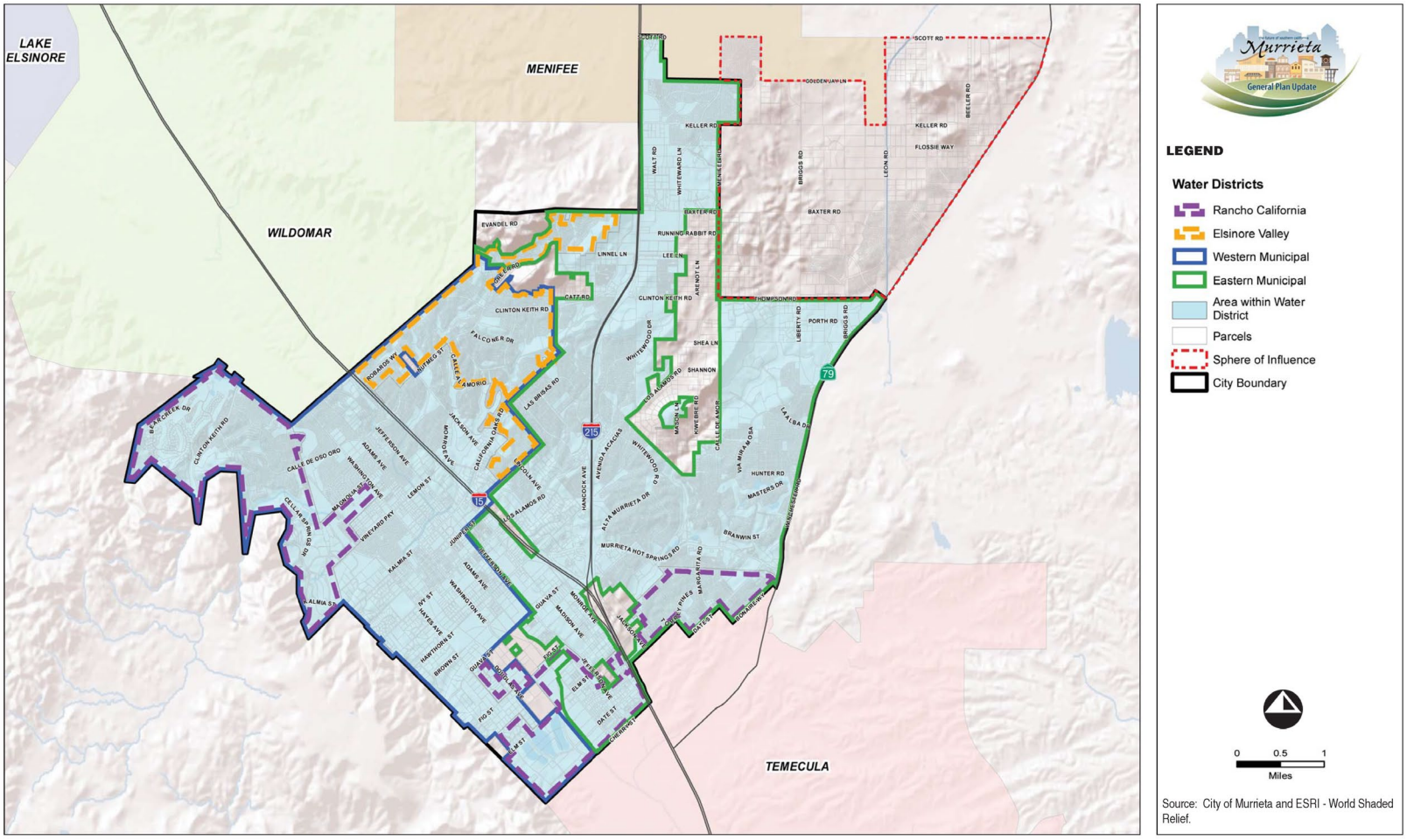
INF-3.4 Bolster and/or upgrade existing transportation facilities and infrastructure that the City maintains that are determined to be vulnerable to extreme weather to make them more resilient to periods of extreme weather events.

6.6 IMPLEMENTATION OF THE ELEMENT

Most of the infrastructure discussed in this Element is built and maintained by entities operating independently of the City of Murrieta. However, the City supports water, sewer, and storm water infrastructure by collecting impact fees from new development. The City has the most direct influence over the construction and maintenance of storm drains, and can direct the construction of other storm water infrastructure in private developments. Larger flood control efforts require coordination with Riverside County Flood Control and Water Conservation District, as well as the U.S. Army Corps of Engineers and neighboring jurisdictions. The City's role in ensuring the provision of water and sewer services is to coordinate land use planning with the water agencies providing those services, and encourage annexation of areas not yet within the service areas of water districts. For those facilities under the City's jurisdiction, it is important that the City's Capital Improvement Program include provisions for new or upgraded facilities, as well as the maintenance of facilities.

Electricity and gas service is provided by utilities on a development-by-development basis, and the City requires new development to verify that service will be available. The City can also contribute to future energy supplies by facilitating efforts to generate renewable energy locally.

~~Insert~~ Exhibit 6-1 Water District Service Area Boundaries



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Water District Service Area Boundaries

Exhibit 6-1

Chapter 7
Healthy Community Element

7.1 INTRODUCTION

The purpose of this Healthy Community Element is to promote the health, safety, and general welfare of Murrieta's residents, workers, and visitors. It highlights the connections between health and the physical, social, and economic environment, and provides an overarching strategy for achieving and maintaining a healthy community. The Element begins by describing the legal and logical basis for creating a Healthy Community Element; is followed by key health conditions and determinants in Murrieta; and continues with the Vision and Key Concepts for health in Murrieta. The centerpiece of the Element is a set of explicit goals and policies to promote a healthy community. The summary of key health conditions and determinants – are organized according to the following key topics:

- Healthy Economy
- Citywide Health
- Land Use and Urban Design for Health
- Environmental Health
- Safe, Sustainable, and Active Transportation
- Public Spaces for Physical Activity and Social Cohesion
- Healthy Goods and Services

The following Community Priorities relate most directly to this Element:

- Provide abundant parks and facilities for recreational activities, and cultural amenities.
- Improve roadway networks to reduce traffic, and provide a citywide system of bicycle lanes and recreational trails that improve accessibility without a car.
- Improve health care within the City, and continue to provide excellent school, police, fire, library, and recreation services.

7.2 AUTHORITY FOR ELEMENT

Health and city planning have been closely connected for a very long time. In fact, the health crises created by rapid industrialization and urbanization during the late 19th and early 20th centuries were the impetus for much of modern planning and zoning. Faced with the rampant spread of diseases such as cholera, and with the frightening health effects of locating industrial

pollution sources like coal-fired manufacturing plants within close proximity to high-density residential urban areas, city planners began requiring basic infrastructure to protect public health – like sewer treatment and garbage disposal – and zoned city blocks to buffer residential areas from polluting industries. The result was the Federal Zoning Enabling Act, which enabled modern zoning and is still the legal rationale for land use regulation and planning across the country. Similarly, the landmark 1926 U.S. Supreme Court decision *Village of Euclid vs. Ambler Realty Co* cited preservation of public health as one of the basic responsibilities of local government. It interpreted zoning as an extension of the local police power to promote the "health, safety, and general welfare" of a community, a legal rationale that still holds sway in the United States today.

Continuing research about a variety of topics, including transportation, air and water quality, economics, nutrition, environmental health, and the design of parks and public spaces, has confirmed a common-sense observation:

> **Your physical surroundings (where you live, work, and play) impacts your health and your day-to-day behavior.**

Since the goal of the General Plan is to create a long-term vision for the City's physical form and character, it provides a fundamental opportunity to promote community health for the long-term. Local governments are not specifically mandated by the State of California *Government Code* (Section 65302) to address health in general plans. However, this Healthy Community Element is consistent with *Government Code* Section 65303, which authorizes local jurisdictions to adopt additional elements to those required by state law when they relate to the physical development of the jurisdiction.

7.3 SETTING THE CONTEXT: COMMUNITY HEALTH CONDITIONS AND DETERMINANTS

A person's or population's health status is determined by a mix of genetics, surrounding environment, and behavior. One's environment can have a direct effect on health, such as if someone is regularly exposed to tobacco smoke or contaminated water. It can also influence day-to-day behavior, such as what someone eats or how much exercise they get. The goal of healthy community planning is to create a built environment that limits exposure to health risks while also supporting healthy behavior and lifestyles.

The following section summarizes the existing health conditions and determinants in Murrieta, identifying some of the key issues that are addressed in the subsequent goals and policies. For additional detail, including a more detailed review of literature and academic research about the connections between planning and health, refer to the General Plan Existing Conditions Background Report and the Community Vision Report.

HEALTHY ECONOMY

Income is one of the strongest determinants of health status. When people have access to high quality employment that pays a living wage, they are more likely to have access to health care, and they can more likely afford basic necessities such as healthy food and housing to support their health. Additionally, people with higher incomes incur less psychosocial stress about how to make ends meet.

The number of jobs in a community in proportion to the amount of housing available is an important indicator of both the availability of housing for the City's workforce, and the availability of jobs for City residents. The need to travel long distances for work or for housing increases time spent driving, which negatively impacts physical health and decreases levels of social engagement. A lack of jobs can also diminish economic vitality, competitiveness, and sustainability.

A small fraction of the City's labor force is employed in jobs within Murrieta. Most of the City's labor force must commute to areas outside the City for employment. Residents with higher education and occupational skills are largely commuting out of the City for work. However, Murrieta has seen great growth in labor force in recent years, with a 16.1% increase in jobs from 2013 to 2018, during that same time span, population increased by only 6.3%. While the City started out as a commuter hub, it is quickly catching up and turning into a more balanced workforce. A growing portion of the labor force that formerly commuted out of the region is now employed in Murrieta. This can be seen in the small business portion of the economy, with 622 new business licenses coming into the City in 2018 alone. The total number of businesses operating with a license in Murrieta is now 9,623.

CITYWIDE HEALTH

The City of Murrieta has a relatively young population with a median age of 34.2 and an average age of 37.4. Additionally, on average in 2018, people in Murrieta enjoyed higher incomes and had higher educational attainment than the Riverside County or national average. Research has correlated higher income and higher educational attainment with positive health outcomes, and younger populations are generally at lower risk for many chronic diseases and illnesses than older populations.[1] At the same time, these demographic figures are just averages. Certain segments of the population, such as young children, older adults, and those with lower incomes, are often more susceptible to a variety of health risks. In addition, Murrieta's young people will age and experience cumulative health impacts over the course of their lifetimes, and high incomes do not always remain constant for all individuals.

The leading causes of death in Murrieta are cancer and heart disease, followed by stroke, chronic lower respiratory disease, and Alzheimer's disease. Deaths from cancer and Alzheimer's are more common in Murrieta than California or Riverside County, while the rates of death from heart disease, diabetes, and chronic liver disease are slightly lower than the State

[1] Wirt, J., Choy, S., Rooney, P., Provasnik, S., Sen, A., and Tobin, R. (2004). The Condition of Education 2004 (NCES 2004-077). U.S. Department of Education, National Center for Education Statistics, Washington, DC: U.S. Government Printing Office.

and County averages.[2] Major risk factors for most of the leading causes of death in Murrieta – cancer, heart disease, stroke, Alzheimer's, and diabetes – include a lack of physical activity, being overweight or obese, chronic stress, and age. A major risk factor for chronic lower respiratory diseases (CLRD) and illnesses, such as asthma, chronic obstructive pulmonary disease, emphysema, pneumonia, and bronchitis, is polluted air. CLRD often restricts physical activity, which has further negative health impacts. In 2004, CLRD was the fourth leading cause of death in Murrieta (as well as in the United States[3]).

Like leading causes of death, hospitalization rates provide a gauge of a population's health status. Murrieta's rates of hospitalizations and emergency room visits for asthma are significantly lower than those of California and other Southern California counties. This may be because of better air quality or because Murrieta's population, which has higher incomes and is more educated than other parts of California, benefits from better preventative care and regular asthma management support. A significant portion of the population still suffers from asthma, which is exacerbated by environmental triggers such as indoor and outdoor air pollution. Murrieta's rate of heart attack hospitalizations is similar to the Riverside County average, which is 32 percent higher than the California average and 54 percent and 45 percent higher than San Diego and Los Angeles Counties, respectively.[4] This means that heart attacks are happening more frequently in Murrieta than many places in the region.

LAND USE AND URBAN DESIGN FOR HEALTH

Planning decisions such as zoning, land use, and urban design can have a strong impact on our transportation choices, housing, and social interactions. These decisions can improve physical and mental health by providing opportunities for physical activity like walking, providing easier access to nutritious food, or enabling neighbors to interact with each other on a regular basis.

Murrieta is consistent with prevailing development patterns in many other fast-growing Southern California cities: low densities and automobile-oriented design, with large sections of the City devoted to single uses, such as residential subdivisions or commercial shopping centers. For example, approximately 30 percent of the City's land area is occupied by single family homes while approximately only one percent is occupied by multi-family homes.

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[2] Refer to Table 5.1-1, *Leading Causes of Death by Percentage, Murrieta, 2003-2007,* in *City of Murrieta General Plan Update Existing Conditions Report*, *(Riverside County Community Health Agency, Department of Public Health, Epidemiology & Program Evaluation Branch, July 2009, with data from State of California, Department of Health Services, Center for Health Statistics, Death Statistical Master File, Riverside County, 2005 (Residence).*

[3] Centers for Disease Control, 2006, "Table B. Deaths and death rates for 2004 and age-adjusted death rates and percentage changes in age-adjusted rates from 2003 to 2004 for the 15 leading causes of death in 2004: United States, final 2003 and preliminary 2004," *National Vital Statistics Reports 2006*, Vol. 54, No. 19, June 28. (http://www.cdc.gov/nchs/data/nvsr/nvsr54/nvsr54_19.pdf).

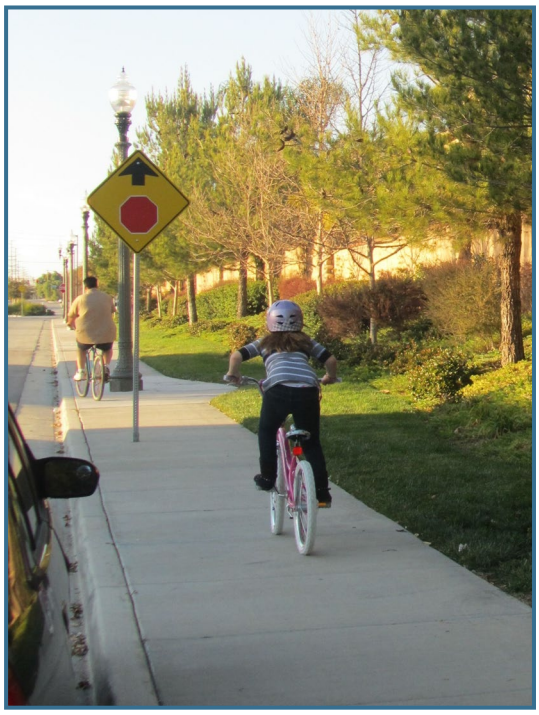
[4] Refer to Table 5.1-2, *Asthma and Heart Attack Hospitalizations per 10,000 Residents, 2006-2008 Combined,* in *City of Murrieta General Plan Update Existing Conditions Report* , from the California Office of Statewide Health Planning and Development (OSHPD) Patient Discharge Database, provided to Raimi + Associates by Meredith Millet, California Department of Public Health, Environmental Health Investigations Branch, March 2010.

ENVIRONMENTAL HEALTH

Environmental health concerns include air pollutants, contaminated land or water, or even toxic substances in everyday household items. While it may be impossible to eliminate all of these environmental health risks completely, efforts to clean up contaminated sites, eliminate toxic substances, and protect air and water quality can reduce environmental health risks.

The California Air Resources Board (CARB) publishes guidelines for protecting “sensitive land uses,” such as residential uses, health care or child care facilities, and recreation facilities, from various types of air pollution like freeways, industrial sites, or shipyards.

Of these pollution types, freeways, truck routes, and other busy roadways are the most prevalent in Murrieta. CARB generally recommends at least a 500-foot buffer between “sensitive land uses” and freeways or truck routes, and most existing residential uses in Murrieta meet this recommendation. There are a limited number of residential uses within 500 feet of the I-15 Freeway as it enters the city from the northwest, in the center of the City along the I-215 Freeway, and along the City’s eastern border along SR-79. Portions of the Loma Linda University Medical Center site are also within 500 feet of the I-215 Freeway.



Land use planning can encourage walking and biking, not only by creating safe pathways but by placing different types of land uses within walking and biking distance of each

Like air pollution, noise pollution in Murrieta mostly comes from freeways and busy roadways, and the most heavily impacted areas are those close to freeways and busy roadways. Partially because it has never been the site of large-scale industrial land use, the City does not contain a high number of contaminated sites, or any strong geographical concentrations of contaminated sites. At the same time, there are contaminated sites of various types throughout the City where clean up is ongoing or needed in the future. There are generally more of these in the central and southwestern areas of the City. Gas stations with underground leaking storage tanks are one of the most common types of contaminated sites. In addition, several formerly contaminated sites in Murrieta are recorded by the State of California as cleaned up.

SAFE, SUSTAINABLE, AND ACTIVE TRANSPORTATION

Most people in Murrieta drive to work, to school, and for daily needs such as shopping. This is similar to the transportation behavior of Riverside County, where in 2008 the average household drove 66.5 miles per day (21.26 miles per day per capita).[5] Currently, with the exception of some areas like Historic Downtown Murrieta, walking or cycling is an infeasible mode of daily transportation for most Murrieta residents. Walking and cycling can provide health benefits by increasing levels of physical activity and reducing levels of air pollution. In addition, the risk of being involved in a collision with an automobile is a significant health risk for drivers, pedestrians, and cyclists alike.

From 2006-2008, 77 percent of Murrieta residents drove to work alone, slightly higher than the County, State, and national averages, while 13 percent carpooled (higher than the California average). Around 1.5 percent of Murrieta residents walked or cycled to work, which was about one-half the State and national average, while 0.1 percent of residents used public transportation to get to work. Similarly, rates of walking to school are lower than State averages.[6]

The average travel time to work (one-way) for a Murrieta resident from 2006-2008 was 36.5 minutes, around 35 percent longer than the California average of 27.0 minutes and 44 percent longer than the national average of 25.3 minutes.[7] This implies that many residents are traveling outside of Murrieta for work. It also means that commute times and vehicle miles traveled could decrease if a higher proportion of residents worked in Murrieta.

Most housing in Murrieta is currently provided in single-use subdivisions with a hierarchical curvilinear street layout of neighborhood feeder streets and large arterials. Streets that do not connect to adjacent areas, cul-de-sacs without pedestrian cut-throughs, blocks with lengths over 1,000 feet, and a lack of nearby non-residential destinations are very common in almost all of the City's neighborhoods. Most of Murrieta's commercial streets are wider than 60 feet, with high street speeds. These factors all reduce the number of route choices and attractive destinations for pedestrians, make walking less comfortable and safe, and make it difficult to walk as part of daily life.

Many of Murrieta's residential neighborhoods, as well as Historic Downtown Murrieta, have consistent and frequent street trees and sidewalks. Mature street trees, such as those found along Washington Avenue, are particularly valuable and pleasant for the pedestrian environment. Most of the residential subdivisions around the City have less mature trees, but with proper maintenance, they will continue to grow and improve the pedestrian environment over time.

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[5] Regional Transportation Plan 2008, Amendment 2 PL data provided by Yongping Zhang and Guoxiong Huang, Transportation Planning Department, Southern California Association of Governments in March 2010 for Raimi + Associates.

[6] 2005 California Health Interview Survey, "Walked/Biked/Skated to or from school in past week," Riverside County and State of California, accessed March 23 at www.chis.ucla.edu.

[7] U.S. Census Bureau, *American Community Survey Selected Economic Characteristics*, 2006-2008, available at www.factfinder.census.gov.

PUBLIC SPACES FOR PHYSICAL ACTIVITY AND SOCIAL COHESION

Parks, plazas, natural areas, sports facilities, and other public spaces can have great health benefits for physical and mental health. They encourage physical activity by creating a venue for organized or casual recreation. They can also provide opportunities for social interaction, relaxation, and a connection with nature, all of which have well-established links to good mental health.

In Riverside County as a whole, 65.2 percent of residents report having visited a park, playground, or open space in the last week, similar to the California average of 68.8 percent.[8] The City has set a standard of 5 acres of parkland per 1,000 residents. At 2011 population levels, it will require 34 acres of additional park space to meet this requirement. There are six locations in the City that are identified as underserved, farther than ½-mile from a park. Research shows that residents in these areas are less likely to meet minimum weekly exercise recommendations.[9]

Trees, sidewalks, and storefronts along Washington Avenue provide a comfortable and interesting environment for walking.

HEALTHY GOODS AND SERVICES

As a whole, the City of Murrieta is well-served by full-service grocery stores providing fresh produce, though some neighborhoods are better-served than others. The City has 14 grocery stores, including large chain vendors as well as locally owned and small grocery stores. This equals about 1.4 full-service grocery stores per 10,000 residents.[10] As a rule of thumb, more than one grocery store per 10,000 residents is considered well served.[11] A privately operated farmer's market and a community garden sponsored by the City are

People are more likely to eat fruits and vegetables when they are sold nearby.

[8] 2007 California Health Interview Survey, "Visited a park, playground, or open space in the last month," Riverside County and State of California, www.chis.ucla.edu.

[9] L. Frank et al., 2000, *Linking Land Use with Household Vehicle Emissions in the Central Puget Sound: Methodological Framework and Findings*, Part D, Vol. 5, Transportation Research, *supra* note 11.

[10] Based on a Murrieta population estimate of 97,029, U.S. Census, *American Community Survey Demographic Estimates,* 2006-2008, available at www.factfinder.census.gov.

[11] The 1 grocery store per 10,000 residents rule of thumb is based on service area calculations used by the supermarket industry.

currently in operation, providing residents additional opportunities to access high-quality local produce.

Access to health care and preventative care is an important component of community health. Over the past few decades, Riverside County's population has increased at a more rapid rate than have the various services, such as physicians and hospitals, necessary to support the population. As a result, Riverside County, in particular the Southern Area which includes Murrieta,[12] experienced a general shortage of hospitals, physicians, and nurses compared to the rest of California. At the same time, three of the five hospitals in the Southern Area of Riverside County, Rancho Springs Medical Center, Inland Valley Regional Medical Center, and the recently completed Loma Linda University Medical Center, are located in or very near Murrieta. As a result, the City of Murrieta itself is fairly well-served by healthcare providers compared to other cities in the surrounding region.

In general, the ability of Murrieta residents to pay for health care, and their likelihood of being insured, is greater than the surrounding region. Approximately two-thirds of Murrieta residents are currently able to pay for hospitalization through private insurance, almost twice the rate for Riverside County. Conversely, only 23 percent paid with Medicare (compared with 42 for Southern Riverside County) and 8 percent paid with Medi-Cal (compared with 15 percent for Southern Riverside County).[13] This corresponds with Murrieta's levels of income, which are higher than the national and county average,[14] and its poverty rates, which are lower. At the same time, there are still significant segments of the Murrieta community, such as the elderly and those with lower incomes that lack affordable access to health care or depend on various medical safety nets for their care.

7.4 SETTING THE VISION FOR A HEALTHY COMMUNITY

The Healthy Community Element seeks to improve the health of Murrieta's residents by:

- Promoting overall physical and mental health
- Creating complete and well-designed neighborhoods and streets
- Reducing the community's exposure to environmental hazards
- Creating public spaces that promote physical activity and social cohesion
- Promoting safe and active transportation

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[12] The Southern Area of Riverside County, as identified by Riverside County, includes Murrieta, Temecula, Canyon Lake, Lake Elsinore, Perris, San Jacinto, Hemet, and areas of unincorporated Riverside County between and surrounding these cities.

[13] 2005 California Health Interview Survey, "Currently Insured" question for Riverside County and the State of California, accessed March 23, 2010 at www.chis.ucla.edu.

[14] U.S. Census, *American Community Survey Selected Economic Characteristics,* 2006-2008, available at www.factfinder.census.gov.

- Supporting educational and occupational opportunities
- Encouraging healthy goods and services that are physically, economically, and culturally easily accessible

The goals and policies in this Element are the result of a comprehensive analysis of existing health and environment conditions and input from the community at public workshops. They reflect a forward-looking but realistic approach to Murrieta's existing suburban character with low densities, single-use land areas, high levels of automobile use and orientation, and a very large land area. It may not be realistic to expect everyone in the City to sell their cars and start bicycling everywhere, but there are opportunities to promote more physical activity through improved park access, a better walking environment, a more well-connected cycling and trail system, and more jobs and services available locally.

As a guide for improving health in a fast-growing suburban community, this Healthy Community Element is a pioneer for other cities across the country. The Element's policies, as well as health-supportive policies in other Elements, include a mix of programmatic and physical strategies that can be implemented over the course of the General Plan. Their success will require patience, persistence, openness to change, and creative thinking about the possibilities of suburban living by local residents, businesses, developers, and the City alike.

The five key topics of the Healthy Community Element goals and policies are as follows:

- Citywide Health
- Environmental Health
- Public Spaces for Physical Activity and Social Cohesion
- Healthy Economy
- Healthy Goods and Services

Additional goals and policies related to the topics discussed in this Element are found in the following Elements: Land Use, Circulation, Conservation, Recreation and Open Space, Air Quality, and Noise.

7.5 GOALS AND POLICIES

CITYWIDE HEALTH

GOAL HC-1 Application of innovative and model best practices in the community health field.

POLICIES

HC-1.1 Collaborate with the Riverside County Department of Public Health's efforts to systematically collect, track, and analyze community health and social, economic, and physical environmental data.

HC-1.2 Establish procedures and tools that help the City consider health in its planning and policy decisions.

HC-1.3 Encourage that the municipal vehicle fleet achieve the highest possible number of fuel-efficient and low emissions vehicles commercially available.

HC-1.4 Seek opportunities to promote healthy lifestyles, activities, and food choices at City offices and City-organized events.

HC-1.5 Promote the health and well being of City employees through health challenges (e.g., weight loss contests, stop smoking, lunchtime/worktime sponsored events, bike to work days), healthy food choices, and healthy work environments, when feasible.

GOAL HC-2 Health and well-being for those who live, work, and play in Murrieta.

POLICIES

HC-2.1 Consider community health in appropriate City actions and policies.

HC-2.2 Establish relationships and collaborate with local health officials, planners, non-profit organizations, hospitals, local health clinics, and community groups to improve community health.

HC-2.3 Seek input from the Riverside County Department of Public Health and others on proposed development projects or other land use and transportation decisions to encourage that the decisions promote health.

HC-2.4 Incentivize health promotion groups to participate at City-sponsored events (i.e., waive booth fees at fairs, etc.).

HC-2.5 Consider one or both of the following:

- Encourage developers of larger commercial/office/business park/ industrial projects or projects that include sensitive uses (schools, senior centers, medical facilities, and larger residential projects) to prepare a health impact assessment (HIA) to determine potential impacts and to incorporate project-specific mitigation measures to avoid this risk.
- A Healthy Development Checklist for use in reviewing new major development projects before finalizing plans.

HC-2.6 Work with Riverside County and community groups to support the availability of substance abuse treatment services to encourage a functional and healthy workforce.

HC-2.7 Educate decision makers and the public on the principles of environmental justice.

HC-2.8 Continually monitor those areas of the City most vulnerable to pollution and environmental hazards through CalEnviroScreen or other tool(s) recommended by the State.

HC-2.9 Consider environmental justice issues and potential health impacts associated with land use decisions, including enforcement actions to reduce the adverse health effects of hazardous materials, industrial activity and other undesirable land uses, on residents regardless of age, culture, ethnicity, gender, race, socioeconomic status, or geographic location.

HC-2.10 Consider environmental justice issues to ensure an equitable provision of desirable recreational facilities, public spaces, and other public amenities throughout the City.

HC-2.11 Utilize a variety of communication techniques and social media tools to convey environmental justice issues and information to the public.

HC-2.12 Inform potentially affected low-income and minority populations when new commercial and industrial developments are proposed with the potential for new sources of pollution.

HC-2.13 Provide the opportunity for affected residents of new developments to participate in decisions that impact their health.

HC-2.14 Provide translation and interpretation services at public meetings on land use and environmental issues affecting populations whose primary language is not English, as needed. Translation time for non-English speakers shall be included

and applied per Government Code Section 54954.3, or other applicable State laws.

ENVIRONMENTAL HEALTH

GOAL HC-3 Clean, breathable indoor and outdoor air.

POLICIES

HC-3.1 Update and enforce tobacco control laws that pertain to location and retailing practices, smoking restrictions, and smoking-free home and workplace laws.

HC-3.2 Disseminate information to tenants and property owners about indoor mold growth hazards, reduction, and prevention methods.

PUBLIC SPACES FOR PHYSICAL ACTIVITY AND SOCIAL COHESION

GOAL HC-4 Public spaces that foster positive human interaction and healthy lifestyles.

POLICIES

HC-4.1 Create public plazas with seating, art, and play features near shopping and business districts.

HC-4.2 Work with restaurants and cafes to create sidewalk outdoor seating areas to activate the sidewalk.

HC-4.3 Allow and encourage residents to apply for street closure permits for neighborhood block parties.

HC-4.4 Build an affordable, accessible, and flexible central gathering/meeting space that individuals and community groups can rent for a variety of social, cultural, educational, and civic purposes.

HC-4.5 Encourage the development and display of public art to promote the history, heritage, and culture of Murrieta.

HC-4.6 Consider adopting a public art ordinance that 1) provides incentives for businesses to provide public art and 2) establishes a fee for commercial and industrial projects that do not wish to install public art.

HEALTHY ECONOMY

GOAL HC-5 **Socially and environmentally responsible businesses that provide meaningful employment opportunities to residents.**

POLICIES

HC-5.1 Develop programs to attract and retain industries that can provide a living wage, provide health insurance benefits, and meet existing levels of workforce education.

HC-5.2 Conduct a green technology business incubator feasibility study.

HC-5.3 Engage existing business incubators and recruit green technology entrepreneurs to their facilities to develop a track record for green technology business development.

HC-5.4 Encourage local employers to adopt healthy living/healthy employee programs and practice such as health challenges (e.g., weight loss contests, stop smoking, lunchtime/worktime sponsored events, bike to work days), healthy food choices, and healthy work environments.

HEALTHY GOODS AND SERVICES

GOAL HC-6 **A range of choices for accessible, affordable, and nutritious foods.**

POLICIES

HC-6.1 Encourage equitable distribution of healthy food retail and dining options in all commercial and employment areas of the City.

HC-6.2 Research and consider land use regulations to limit fast food outlet density.

HC-6.3 Identify and utilize available incentives, grants, and/or programs to encourage small grocery or convenience stores to sell basic healthy fresh food items. Programs could include grants or loans to purchase updated equipment, publicity, directories of healthy food outlets, or connecting stores to wholesale sources of healthy food.

HC-6.4 Encourage restaurants to voluntarily eliminate transfats from their menus.

HC-6.5 Identify and utilize available incentives, grants, and/or programs to encourage restaurants to create a healthier dining experience for customers by highlighting healthy dishes, offering smaller portion sizes, and disclosing nutrition facts.

HC-6.6 Support community education programs on healthy eating habits and lifestyles, including topics such as nutrition, physical activity, and vegetable gardening.

HC-6.7 Encourage larger food retailers to carry specialty ethnic food items and support the opening of smaller ethnic food stores.

GOAL HC-7 A variety of businesses that help create complete neighborhoods and support community health.

POLICIES

HC-7.1 Encourage fitness centers such as gyms, yoga and dance studios, martial arts centers, and rock climbing facilities to open in Murrieta.

HC-7.2 Encourage safe, high quality, and affordable child care services for residents and workers in or near housing, transportation, and employment centers.

GOAL HC-8 Accessible health care and preventative care.

POLICIES

HC-8.1 Work with local and regional health care agencies to promote preventive treatment and broad access to health care.

HC-8.2 Work with existing organizations and agencies to support high-quality affordable and convenient access to a full range of traditional and alternative primary, preventive, emergency, and specialty health care options.

HC-8.3 Partner with community groups, the Riverside County Public Health Department, and the Murrieta Valley Unified School District to encourage school-based health centers.

HC-8.4 Encourage that new public facilities, schools, parks, recreational facilities, and commercial, office, and medical buildings provide drinking fountains.

7.6 IMPLEMENTATION OF THE ELEMENT

The topic of Healthy Community crosses all areas of City government, and implementation will require coordination between a number of City departments, including Community Development, Economic Development, Public Works, and the Community Services District.

The Community Development Department and other relevant departments will review the City's existing codes and ordinances (including the Development Code and the Building Code) and make recommendations on how they can be improved to create more positive health outcomes in the City.

The Economic Development Department will pursue a program of incentives and outreach to attract health care related facilities and businesses to the City. The Economic Development Department will also explore incentives to 1) maintain or expand existing or 2) locate and establish new grocery stores and other healthy food purveyors, and to the extent possible, strive for an equal distribution of healthy food stores throughout the City.

The City can lead by example by expanding the Healthy Murrieta program and by developing City-sponsored programs to address employee health for city employees. Suggested programs could include weight loss challenges, exercise challenges, lunchtime exercise programs, sponsoring bike and walk to work days, and providing transit passes for employees.

Chapter 8
Conservation Element

8.1 INTRODUCTION

The purpose of the Conservation Element is to provide direction regarding the conservation, development, and utilization of natural and cultural resources. It serves as a guide for the City of Murrieta, its residents, and its businesses to understand what natural or other resources exist in the City, how development impacts these resources, and methods to maintain, preserve, or conserve these resources. The Conservation Element considers the following resources in the natural environment: water; hills and ridges; and mineral, paleontological, and biological resources. It also considers resources within the built environment: urban ecology, farmland, cultural, energy, and solid waste.

Because many of these resources are embodied in the natural and built landscape of Murrieta, the Land Use Element is an essential part of the City's conservation efforts. Other Elements that directly relate to natural resources are Infrastructure, Recreation and Open Space, and Air Quality.

The following Community Priorities relate most directly to this Element:

- Protect the natural beauty of the mountains, hills, and waterways.
- Preserve elements of Murrieta's rural heritage.
- Create a vibrant, prosperous Historic Downtown that serves as a community center and provides a variety of quality shopping and dining experiences.

8.2 AUTHORITY FOR ELEMENT

California *Government Code* Section 65302 (d) requires "*that a General Plan include a conservation element for the conservation, development, and utilization of natural resources including water and its hydraulic force, forests, soils, rivers and other waters, harbors, fisheries, wildlife, minerals and other natural resources.*"

8.3 SETTING THE CONTEXT: KEY ISSUES AND CHALLENGES

The Conservation Element is designed to protect, maintain, and enhance Murrieta's natural resources, and balance current community resource needs with the ability of the community's natural resources to meet those needs and benefit the common good. Murrieta recognizes that resources are finite, and is only able to support the human economy and the global ecosystem if they are used at a sustainable rate and allowed to replenish. Conservation of resources will also enable the City to become more self-sufficient, and reduce long-term costs associated with energy, water, and waste. Murrieta promotes sustainability as a core principle, and this concept applies directly to the management of resources as discussed in this Element. Additionally, protecting and enhancing the natural environment contributes directly to the community's quality of life.

NATURAL ENVIRONMENT

Murrieta's natural environment provides resources such as water, landscape, minerals, plants, and animals. Some of these resources are actively used in the City and must be managed for those purposes. While not directly used by the current inhabitants of the area, plants and animals are inseparable parts of the functioning ecosystem in the natural landscape. Their fossilized remains provide a record of natural history. The community benefits from natural systems such as waterways that allow groundwater recharge and plants that prevent erosion. It is therefore important to understand how these natural systems work.

Water

WATERSHED AND GROUNDWATER

The City of Murrieta and most of the Sphere of Influence (SOI) are located within the inland portion of the Santa Margarita River Basin, which comprises approximately 750 square miles. Murrieta Creek and Temecula Creek collect water from the upper watershed and represent the main tributaries to the Santa Margarita River. Western portions of the City are within the southern portion of the Santa Ana River Basin. The regional boundary for the two basins divides the Santa Margarita River drainage area from that of the San Jacinto River, which normally terminates in Lake Elsinore.

Murrieta Creek extends approximately 14 miles and drains an area of approximately 220 square miles. Warm Springs Creek is a major tributary of Murrieta Creek that traverses Murrieta. Both creeks remain in a semi-natural state, with areas of significant native vegetation occurring along portions of each. There are other minor tributaries and intermittent stream courses that occur within the General Plan Planning Area, as well as vernal pools and seasonal wetlands.

Storm water runoff represents the primary source of surface water within the Murrieta Creek Basin. Additional sources of surface water include groundwater from springs, runoff from agricultural uses, and snowmelt.

Groundwater is water contained within natural underground water systems below the Earth's surface, in which the water flows through porous formations called aquifers. Groundwater recharge is an important source of water supply to each of the retail water purveyors that serve the City and the Sphere of Influence. Numerous wells have been drilled within the groundwater basins to allow for the extraction of water from the underlying reservoirs.

Major groundwater basins underlying Murrieta and the Sphere of Influence include the Murrieta-Temecula Basin and the French Basin. The Murrieta-Temecula Basin underlies approximately 60,000 acres, including the Murrieta Creek channel and Warm Springs Creek, which serve as important sources of groundwater recharge. Water flows from the Basin to the Lake Elsinore area in the northwest and to the Santa Margarita River to the southwest. In the northeast, the French Basin underlies approximately 3,500 acres and discharges to Warm Springs Creek.

Water use and supplies in Murrieta and the Sphere of Influence are discussed in the Infrastructure Element.

UPPER SANTA MARGARITA INTEGRATED REGIONAL WATER MANAGEMENT PLAN

The Integrated Regional Water Management Plan (IRWMP) is a planning and management tool to facilitate efficient use of water resources and to develop effective water conservation measures, using a regional- and watershed-based approach. Development of the IRWMP is a cooperative effort by the Rancho California Water District, Riverside County Flood Control and Water Conservation District, and County of Riverside.

The intent of the IRWMP is to enable greater watershed-wide coordination and management of water resources within the Santa Margarita Watershed as a whole, as well as adjoining watershed and regional planning and funding efforts. Through the IRWMP, stakeholders collaborate across jurisdictional boundaries to implement water resource management projects. These stakeholders include regional water agencies; flood control districts; counties; cities; and federal, state, and local agencies. The IRWMP also provides opportunities to identify and evaluate information on the present and future needs within the watershed for consideration in the California Water Plan.

STORM WATER MANAGEMENT

Storm water drainage infrastructure within the City of Murrieta consists of a network of natural streams, improved channels, storm drains, catch basins, and detention basins. These facilities and their necessary maintenance are provided by the Riverside County Flood Control and Water Conservation District and the City.

To minimize detrimental effects of runoff water quality, the City of Murrieta implements its Storm Water Management Plan (SWMP). The SWMP identifies methods to reduce potential storm water runoff and the contribution of pollutants to the storm drain system from industrial, commercial, residential, and municipal sources.

Hills and Ridges

Ridgelines are visible from the freeways traversing Murrieta.

Murrieta's natural setting offers views and vistas of features that have both scenic and ecological value. A variety of rolling hillsides, mountain ranges, the Valley floor, and varied natural vegetation contributes to the unique visual character of Murrieta, as well as the surrounding region.

The Hogbacks are a prominent visual feature within the Murrieta landscape that can be seen from many vantage points. This ridgeline crosses the eastern portion of the City and supports areas of relatively undisturbed natural vegetation along the western slope.

Views to the Santa Rosa Plateau occur along the I-15 and I-215 Freeways, as well as from lands located to the west of the Hogbacks. Views from these locations also include the largely undisturbed ridgelines that extend to the north and south of the Plateau, combined with hillside areas supporting chaparral habitat. Oak woodland habitat and a variety of canyons are also present along the foothills of the Santa Ana Mountains and add to the existing visual character.

The Murrieta *Municipal Code* establishes guidelines for future development proposed along the City's hillsides. Section 16.24, Hillside Development, provides measures for the long-term protection of existing natural topography and scenic character whenever feasible through the regulation of grading activities, intensity, and density of development proposed, structural massing, building height, and other characteristics in order to minimize potential impacts on the existing viewshed.

SCENIC CORRIDORS

Views from the major freeways traversing Murrieta play a large part in defining the community's identity for people passing through the area. Both freeways have been recognized as possessing scenic qualities.

Interstate 15 is included in the Master Plan of State Highways Eligible for Official Scenic Highway Designation, and Interstate 215 was previously shown on the County's Master Plan of Scenic Highways as being eligible for official designation as a County Scenic Highway.

Mineral Resources

The City lies within the Temescal Valley Area within Riverside County, which has become a major area for mining. Existing mineral extraction activities and commodities produced in this area primarily consist of clay, specialty sands, and specialty stone. Construction aggregate (crushed rock, sand, and gravel) also represents a valuable mineral commodity. Sand, gravel,

and clay are generally used for fill purposes, for the construction of roads and highways within urban and suburban development, and for other infrastructure purposes such as canals and aqueducts.

The extent and significance of mineral deposits in the City and the Sphere of Influence are largely unknown. *Exhibit 8-1*, *Mineral Resources*, shows the locations of known resources. Five resource sites are identified within the City. These sites contain support clay, sand and gravel (construction), feldspar, feldspar/silica, and gold. One geothermal resource is also identified within the City boundaries. Three additional sites are identified within the Sphere of Influence, which contain feldspar, gold, and stone (crushed/broken). According to the State of California Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR), no underlying oil fields are present in the City, the Sphere of Influence, or in outlying areas.

The Murrieta *Development Code* provides guidelines for the review of surface mining permit applications that are intended to create and maintain an effective surface mining and reclamation policy, as authorized by the California Surface Mining and Reclamation Act of 1975. The *Development Code* gives provisions for the regulation of surface mining operations in order to prevent or minimize potentially adverse effects, and provides for reclamation of mined lands.

Paleontological Resources

Paleontological resources are the fossil remains or traces of past life forms, including both vertebrate and invertebrate species, as well as plants. The Murrieta area is generally underlain by highly fossiliferous rock units that include the Pauba formation and Unnamed Sandstone formation. The San Bernardino County Museum Earth Sciences Division has classified the majority of the City and the Sphere of Influence as having a high potential for containing significant, nonrenewable paleontological resources.

Formations in the Murrieta area have yielded extensive fossil remains that include mammoth, mastodon, ground sloth, dire wolf, short-faced bear, saber-toothed cat, tapir, camel, llama, and pronghorn. Known deposits have also yielded smaller vertebrate fossils including rabbit, rodent, bat, shrew, bide, amphibian, lizard, tortoise, and turtle.

Biological Resources

WILDLIFE HABITAT

Approximately 7,291 acres of undeveloped/vacant land with potential wildlife habitat are present within the approximate 26,852-acre General Plan Planning Area. Concentrated areas of natural vegetation occur along the foothills and canyons in the western portion of the City, in the northern portion of the City along the northeastern hillsides, along Murrieta and Warm Springs Creeks, and along the slopes and base of the Hogbacks.

Plant communities within the General Plan Planning Area include annual grassland, coastal sage scrub, chaparral, oak woodland, riparian, and wetland habitat. *Table 8-1*, *Wildlife Habitat in Murrieta and Sphere of Influence*, lists specific categories and acreages of the plant

communities within the General Plan Planning Area. *Exhibit 8-2*, *Vegetation and Land Use*, identifies the location of potential wildlife habitat areas within the General Plan Planning Area.

Table 8-1
Wildlife Habitat in Murrieta and Sphere of Influence

Wildlife Habitat*	Wildlife Habitat Mapping Units (Common Name)	Approximate Area (acres)
Annual Grassland	California annual grassland alliance	2,340
Coastal Oak Woodland	Five different plant associations	303
Coastal Scrub	Sixteen different plant associations	3,372
Cropland, Orchard, Vineyard	Agricultural Land Use	5,662
Eucalyptus	Eucalyptus Alliance	35
Fresh Emergent Wetland	Bulrush-cattail	107
Lacustrine	Water mapping unit	128
Mixed Chaparral	Twelve different plant associations	1,636
Riverine/Lacustrine	Sandbars, mud flats, riparian shrubs and trees associated with a river	137
Urban	Five different mapping units	12,816
Valley Foothill Riparian	Nine different plant associations	316
TOTAL		**26,852**

* Using the Wildlife Habitat Relationship (WHR) system of vegetation classification. Descriptions of each habitat type and associated wildlife are provided in the Existing Conditions Report.

SPECIAL-STATUS SPECIES

Special-status species include plants and animals that are listed as rare, threatened, endangered, or otherwise identified for tracking and protection at the state or federal level. Conservation efforts in the *Western Riverside Multiple Species Habitat Conservation Plan* are largely aimed at species associated with unusual soil types. Special-status plant species are likely to occur in habitat areas associated with vernal pools and clay soils, wetlands, and areas supporting chaparral, scrub, and woodlands.

Within the General Plan Planning Area, listed species with specific soil types include Munz's onion, San Diego ambrosia, spreading navarretia, California Orcutt grass, and Quino checkerspot butterfly. In addition, coastal scrub and chaparral habitat areas are important habitat for the Quino checkerspot butterfly and California gnatcatcher. Annual grassland and coastal scrub habitat are important to the Stephens' kangaroo rat, while riparian, lacustrine, and emergent wetland habitat are important to the least Bell's vireo and southwestern willow flycatcher.

WESTERN RIVERSIDE MULTIPLE SPECIES HABITAT CONSERVATION PLAN

Murrieta is a Permittee under the *Western Riverside Multiple Species Habitat Conservation Plan* (*MSHCP*), and as such, has existing conservation agreements and also sets aside land parcels within the City as Conservation Land to meet the land acquisition goals of the *MSHCP*. The conceptual conservation scenario for the MSHCP Reserve Area is based on existing public lands, undeveloped land (Core Areas), and identified potential Linkages between the Core Areas.

Warm Springs Creek and Murrieta Creek are important natural features within the City that are protected for their biotic and aesthetic value; they offer wetland resources and allow for wildlife migration. These features are included in the MSHCP as potential Linkages between Core Areas.

For discussion and planning purposes, the Core Areas and Linkages are grouped into Area Plans and Subunits, as shown in *Exhibit 8-3*, *MSHCP Area Plans and Subunits*. The *MSHCP* identifies the following Biological Issues and Considerations for the Subunits within the City and the Sphere of Influence:

- **Murrieta Creek (SW1) and Santa Rosa Plateau (SW6).** Maintain habitat function as riparian and aquatic species live-in habitat and large mammal movement linkage.
- **French Valley/Lower Sedco Hills (SW5) and Warm Springs Creek/French Valley (SCM1).** Maintain habitat Core for narrow endemic plants (saline/alkali and clay), Quino checkerspot butterfly, Riverside fairy shrimp, Los Angeles pocket mouse, western pond turtle, and habitat linkages through the City limits (east-west and north-south) for wildlife movement and plant dispersal.

BUILT ENVIRONMENT

Murrieta's built environment interacts with the natural environment by drawing on resources like soil and energy and creating new resources such as farmland, historic structures, and products that can be re-used or recycled. The community also seeks to integrate the natural world into the urban fabric by preserving open space and introducing parks and trees. Developing the City while enhancing the functioning of natural systems is a prudent way to maintain and benefit from natural resources.

Urban Ecology

In urban areas where the majority of land is given over to pavement, buildings, or other kinds of development, ecologically functioning land is a unique and valuable asset with widespread positive impacts. Creeks, wetlands, habitat areas, parks, trees, gardens, storm water management areas, and other open space can serve as interconnecting islands of bio-diversity, providing valuable ecological services.

PARKS AND OPEN SPACE

Discussed extensively in the Recreation and Open Space Element, Murrieta's parks and natural open space provide opportunities for outdoor recreation and contact with nature. Trails have

been constructed through several parks and open space areas. Much of Murrieta's open space follows natural drainage courses.

TREES

Murrieta has a *Tree Preservation Ordinance* that protects native Oak and Sycamore trees, and trees of historic or cultural significance, groves and stands of mature trees, and mature trees in general. Trees protected under this ordinance include palms and trees at the Murrieta Hot Springs Resort, conifers dating from pre-World War I along Murrieta Hot Springs Road, and a landmark cottonwood tree associated with a former ceremonial ground and trail route located near Lemon Street.

Farmland

Murrieta's economy was once based on agriculture, and there is still farmland within the City and the Sphere of Influence (SOI). California's Farmland Mapping and Monitoring Program categorizes the quality of farmland in the state based on such factors as soil type, growing season, availability of water, and history of crop production. *Exhibit 8-4*, *Important Farmland*, shows the location of farmland types in the City and SOI, including 3,207 acres of Farmland of Local Importance within the City boundaries.

Table 8-2, *Farmland Types in Murrieta and Sphere of Influence (2008)*, provides a breakdown of the acreage of lands within each Farmland Mapping Category for the City and the Sphere of Influence. These Farmland Mapping Categories are defined in the Existing Conditions Background Report.

Table 8-2
Farmland Types in Murrieta and Sphere of Influence (2008)

Farmland Mapping Category	Total in Acres
City of Murrieta	
Urban Built Out Land	11,348
Grazing Land	1,540
Farmland of Local Importance	3,207
Prime Farmland	65
Farmland of Statewide Importance	28
Unique Farmland	81
Other Land	5,242
Sphere of Influence	
Urban Land	442
Grazing Land	1,164
Farmland of Local Importance	2,581
Other Land	1,155

Source: City of Murrieta GIS Data. December 2009. Farmland Mapping Categories are defined in the Existing Conditions Report.

Exhibit 8-4 and *Table 8-2* are based on the Important Farmland maps prepared by the State in 2008. These maps include land that was used for agricultural production anytime in the four years before the maps were prepared. However, by 2010 the extent of land used for agricultural production within the City limits was far less than the farmland depicted in *Exhibit 8-4*.

WILLIAMSON ACT LANDS

To preserve agricultural uses, the Williamson Act established an agricultural preserve contract procedure by which counties or cities within California can tax landowners at a lower rate, in return for a guarantee that these properties will remain under agricultural production for a period of 10 years.

According to the California Department of Conservation, no Williamson Act encumbered properties are located within the City of Murrieta. Approximately 58 acres of encumbered acreage are located outside of the City boundary within the Sphere of Influence, as shown in *Exhibit 8-5*, *Williamson Act Farmland (2007)*. None of these contracts are in non-renewal status with the State.

Cultural Resources

ARCHEOLOGICAL AND HISTORICAL RESOURCES

Murrieta enjoys a rich cultural history, with more than 199 documented cultural, archaeological and historic sites. Cultural and archaeological resources include remnants of prehistoric habitation such as milling features and food processing artifacts, stone artifacts (flakes, points, debitage), sites with rock art, village complexes and habitation sites, and prehistoric quarries. Historic sites include built resources and historic archaeological sites (trash scatters, habitation remains). It also includes historic resources such as ranches, homes, and sites of historic buildings that have been demolished. The most historically significant areas generally occur along Washington Avenue, west of the I-15 Freeway, and Los Alamos Road, east of the I-215 Freeway.

This grain elevator, built in 1918, is one of the most noticeable historic structures in Murrieta.

The General Plan Planning Area contains a number of roads which, due to their individual qualities or historical significance, may warrant recognition or even conservation programs to preserve their character. The historic value of Los Alamos Road was recognized by the Murrieta City Council on July 16, 1991. In March of the following year, the Riverside County Historical Commission recommended that a four-mile stretch of

Los Alamos Road, between Via Santee and Winchester Road, be designated as a County Historic Route.

The City has a *Cultural Resource Preservation Ordinance* that provides *"a mechanism by which community resources such as buildings, structures and sites within the City of Murrieta, which are of pre-historic or historic interest or value, or which exhibit special elements of the City's architectural, cultural, or social heritage may be identified, protected, enhanced, perpetuated and used in the interest of the public's health, safety, welfare, and enrichment."* Under this ordinance, a natural or constructed feature may be designated as an individual resource, and a geographic area may be designated as an archeological district or a historic preservation district. The City of Murrieta Historic Preservation Advisory Commission acts in an advisory capacity to the City Council with regard to the preservation of cultural and archaeological resources within the City's boundaries.

In addition, the City will adhere to Senate Bill 18 (SB 18) and Assembly Bill 52 (AB 52). SB 18 requires agencies, such as the City of Murrieta, to consult with California Native American tribes and provide opportunities for involvement to tribes, during the preparation or amendment of the general plan. AB 52 specifies that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. AB 52 requires a lead agency to begin consultation with a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project, if the tribe requested consultation to the lead agency in writing.

HISTORIC DOWNTOWN MURRIETA

The Historic Murrieta Specific Plan, predecessor to the Downtown Murrieta Specific Plan, was adopted in October 2000 and amended February 2003 and March 2017, when it was renamed. The Downtown Murrieta Specific Plan provides a framework for the future enhancement and preservation of Historic Downtown Murrieta. The Specific Plan Area is bounded by Jefferson Avenue to the east; Ivy Street to the south; Hayes Avenue to the west; and Kalmia Street to the north. The Specific Plan sets forth guidelines for design of appropriate development including architectural characteristics, site planning, parking, landscaping, and signage. The Specific Plan also identifies five gateways to Historic Murrieta that have visual prominence including: Washington Avenue and Kalmia Street, Washington Avenue and Ivy Street, Jefferson Avenue and Kalmia

This building on Washington Avenue is believed to be the former A. K. Small & Co. dry goods store, pictured in the Vision chapter as it appeared in 1917.

Street, Jefferson Avenue and Juniper Street, and Jefferson Avenue and Ivy Street. Other elements contributing to the historic character of the area include a variety of large, mature trees, particularly along Washington Avenue.

A number of improvements are planned or have been made in recent years within Historic Downtown Murrieta. These projects include design elements to enhance the overall historic theme and character, infrastructure and street improvements, parks, and upgrades to various City facilities. Historic Downtown continues to be a focal point for future improvements and planning efforts.

Energy

Energy resources are commonly categorized as renewable or nonrenewable. Future availability and environmental costs are growing concerns with nonrenewable energy. Two renewable energy sources, solar radiation and wind energy, are readily available in the area. Geothermal resources also exist, as suggested by the presence of thermal springs. However, most energy used in Murrieta comes from sources located elsewhere.

Electricity is provided by Southern California Edison (SCE), whose facilities include hydroelectric, wind, solar, gas, and coal power plants. Due to state targets, a growing percentage of the energy supplied by SCE is from renewable sources: wind, geothermal, solar, biomass, and small hydroelectric.

Natural gas is supplied through transmission pipelines by the Southern California Gas Company. In areas of the City where natural gas infrastructure is not available, homes or businesses use propane gas. Individual propane tanks are located on the property and the owners or occupants execute private agreements with propane companies to maintain and refill the tanks.

Transportation energy is supplied primarily by petroleum or fossil fuels, although hybrid and electric-powered vehicles are becoming more available, as well as vehicles powered by alternative fuels. At this time, gasoline and diesel fuels are readily available within the General Plan Planning Area and throughout the Southern California region. The environmentally significant consequence of using these fuels is the atmospheric release of greenhouse gases and other pollutants.

WIND ENERGY

Wind turbines on residential lots can reduce household consumption of utility-supplied electricity. In order to promote the safe, effective, and efficient construction and use of non-commercial wind energy conversion systems on rural residential lots, the *Municipal Code* includes standards for regulating these systems. The standards are intended to minimize visual, noise, and safety impacts on the surrounding community.

Solid Waste

Murrieta was found to be in compliance with AB 939 in 2006, having made a good faith effort (49 percent diversion rate) to meet the goal of diverting 50 percent of solid waste from landfills. In the two years since AB 939 compliance has been measured according to Annual Per Capita Disposal Rate, Murrieta has succeeded in meeting the AB 939 target set by CalRecycle. The City of Murrieta has established a number of programs in partnership with Waste Management that promote recycling, composting, and waste reduction, all of which have contributed to the City's increasing diversion rate and decreasing disposal rate in recent years.

8.4 SETTING THE VISION: KEY CONCEPTS AND VISION FOR GENERAL PLAN

NATURAL ENVIRONMENT

Water Supply

Water is a precious natural resource in Murrieta and in California. Water conservation and efficiency efforts in Murrieta are occurring against a statewide backdrop of increased demand for water and decreased supply due to many seasons of drought, which will likely be exacerbated in the future by climate change. In addition, the southern California water supply has been reduced by severe restrictions in water diversions from the Sacramento-San Joaquin River Delta for the State Water Project, which has historically supplemented water supplies along with water from the Colorado River.

California law requires Murrieta and other local governments to adopt ordinances ensuring that large landscaped areas are designed to be water-efficient. Plant choices, efficient irrigation systems, and other landscape design techniques can reduce water consumption from large projects such as parks, golf courses, homeowner association sites, and institutional uses, as well as residential yards and smaller landscaped areas. Murrieta adopted the latest *Water Efficient Landscape Ordinance* in 2018.

Future water supplies in Murrieta will rely heavily on recycled/reclaimed water to reduce the demand on potable water supplies. Water districts will need to ensure their water reclamation facilities and pipeline infrastructure are planned and installed according to their Urban Water Management Plan projections. Coordination between the City and water districts will be essential as further development is planned.

Residents and businesses in Murrieta will need to play a role in using water resources efficiently, and this will be encouraged through education and incentives from the City and water agencies.

Storm Water Management and Groundwater Recharge

Groundwater is an important source of water for Murrieta. When land is in its natural state, groundwater supplies are recharged as rain infiltrates the soil. But when areas become urbanized and soil is covered by impervious surfaces, this storm water runs off and is often diverted into channels that carry the water away. As urbanization continues in Murrieta, efforts to recharge groundwater will be important for the long-term sustainability of the City's water supply.

Groundwater recharge can be integrated into the design of development projects by preserving natural drainage courses, encouraging the use of pervious surfaces, and creating areas for water retention and infiltration. Recharge techniques that may be used on-site or off-site include recharge ponds, injection points, and storm water retention ponds.

Besides recharging aquifers with clean water, implementing a comprehensive storm water management program can reduce pollution and erosion, and prevent flooding. Unmanaged urban storm water runoff can cause polluted and excessive storm water flows that diminish water quality in the Santa Margarita River Basin.

Site design can use vegetated areas to remove pollutants from runoff and allow water to infiltrate the soil rather than flowing

In implementing its Storm Water Management Plan, the City will continue its efforts to keep pollutants from entering urban runoff and to provide measures that remove pollutants before runoff reaches the creeks.

Hills and Ridges

Murrieta's hills and ridges offer scenic and biological values, and are considered to be a community treasure. The City has regulations that protect hillside topography and scenic characteristics and prevent slope erosion, and seeks to preserve habitat areas such as the foothills of the Santa Ana Mountains under the MSHCP.

Scenic corridors through Murrieta allow enjoyment of these views. With formal designation of these corridors, the scenic qualities of Murrieta could be recognized at the County and State level as a community amenity.

Mineral Resources

The City of Murrieta recognizes the economic value of mining areas and facilities within its borders. Regulation allows these facilities to co-exist with other land uses and reduces negative impacts that can be associated with mining operations.

Archaeological Resources

The City of Murrieta recognizes the value of prehistoric and Native American traditional cultural and archaeological sites within its borders and the need to preserve these sensitive non-renewable resources. The impacts of the area's traditional inhabitants have played in the historic development of the City is also recognized and important to future growth and development. Appropriate steps and protocols as outlined in the *Cultural Resources Preservation Ordinance and SB 18 and AB 52* will be taken to carefully balance protection of these archaeological sites, cultural resources and traditional cultural properties with the need to accommodate development.

Paleontological Resources

Paleontological resources in Murrieta will require continued protection during grading and excavation for development. Local displays of excavated fossils could also provide educational benefits and promote a sense of place and history, with the potential to attract visitors as well.

Biological Resources

The preservation of biological resources is of great importance to the City and to the County of Riverside. Ongoing net loss of habitat due to development will contribute to the regional loss of habitat on a cumulative level. Therefore, the City will continue to carefully balance protection of natural lands, habitat, and protection of multiple species with the need to accommodate development. In this effort, Murrieta will maintain compliance with the MSHCP and related state and federal regulations aimed at protecting biological resources.

BUILT ENVIRONMENT

Urban Ecology

Murrieta seeks to balance community needs within the framework of an improved urban ecological system. Whether naturally occurring or constructed, areas with functioning ecology can protect against natural disasters and negative environmental impacts. For example, wetlands can protect urban areas from flooding and provide centers of habitat for ecological restoration work. Trees and landscaping provide a wide array of ecological benefits, including absorbing storm water, cooling surrounding temperatures, removing air pollutants, filtering polluted water, sequestering carbon dioxide, and providing animal habitat. Permeable landscape features that can treat and retain storm water, instead of releasing it immediately during a storm, protect downstream waterways, wetlands, and water bodies from pollution, sedimentation, and flooding.

Preserving native species is a basic requirement for a sustainable ecological system, and can also enhance the quality of life of a community, when residents are provided opportunities to connect with nature and natural systems. Sustaining an ecological system requires protecting it from the negative impacts of invasive species that often accompany the urban edge. It must also be protected from pesticides and herbicides, which can contaminate water, air, and food; breed resistance in pests; and have widespread negative health effects on plants, animals and humans.

Murrieta sets aside natural open space for habitat, drainage, and recreation. In addition, the community constructs a variety of green spaces. As discussed in the Recreation and Open Space Element, the City of Murrieta has a parkland standard of 5 acres per 1,000 people, and seeks to distribute parks among all neighborhoods. Trees and landscaping are promoted throughout developed areas, supporting property values while offering other benefits. Water-efficient landscaping with "California-friendly" plants can also provide habitat for fauna such as butterflies and birds. To assist in storm water management, planted drainage and retention areas will be incorporated into development.

Agriculture

Preservation of farmland in areas less suitable for urban uses can offer multiple benefits: scenic value, maintaining a link to Murrieta's heritage, and providing access to locally grown food. A farmer's market in Murrieta demonstrates the value that residents place on obtaining fresh, locally grown produce. Residents also have opportunities to see where food is grown when farms and ranches operate farm stands and other visitor-serving agritourism activities, which can also improve the financial viability of these agricultural uses.

Pumpkins from the "Produce for People" community
garden were sold at City Hall to raise funds for

Increasingly, cities and master-planned communities are seeking to incorporate small-scale agriculture as an amenity for urbanized areas. "Urban agriculture" includes urban farms, community gardens, and cultivation on private properties. Facilities for processing and distributing food are another part of a local food system that supports agricultural uses. Consistent with its heritage and interest in community health, Murrieta will encourage opportunities for community members to access fresh, locally grown food.

Cultural and Historical Resources

Murrieta promotes the preservation of historically and architecturally significant sites, structures, and landscape features within the community and seeks to encourage proper adaptive reuse of historic structures and sites. In reviewing proposed development projects involving historic resources, the use of the *California Historic Building Code* and the U.S. Secretary of the Interior's rehabilitation, reconstruction, restoration, and preservation treatments has assisted in maintaining the historic character of the City while achieving local and regional growth goals.

The City will continue to provide protective measures for the City's Historic Downtown and Los Alamos area, as well as other historically and architecturally significant sites, structures, and

landscape features throughout the community that enhance and/or reinforce the City's rich history and character.

Historic Downtown Murrieta has been recognized as a special cultural resource in the City of Murrieta. The *Downtown Murrieta Specific Plan* describes this vision and the guiding principles to establish a cultural and governmental center, create an attractive town center, improve the historic and pedestrian scale, and foster proactive economic development.

Building on its historic resources and the cultures that make up Murrieta, the City can help satisfy community demand for more cultural institutions and events.

Energy

Murrieta recognizes the responsibility of local governments to help combat climate change and ensure stable energy supplies. As such, the City maintains and updates as necessary a Climate Action Plan (CAP) which includes strategies and measures to reduce greenhouse gas (GHG) emissions.

Renewable energy can be produced at a large scale
in fields, or by individual panels or turbines located on smaller properties.

Energy conservation and improvements in efficiency reduce demand for energy, while production of energy from renewable sources such as wind and solar has far fewer negative impacts than producing energy from fossil fuels. As such, the City is dedicated to using energy more efficiently and reducing greenhouse gas emissions — both in municipal operations and in the community as a whole.

Buildings and transportation combined account for approximately two-thirds of the energy consumption and greenhouse gas emissions in the United States. Therefore, in addition to efforts to reduce energy consumption in buildings, land use decisions and transportation behavior that decrease vehicle miles traveled can play an important role in reducing the energy consumed and emissions produced from transportation.

Solid Waste

Discarded waste uses up finite landfill space and often releases toxic material or produces toxic concentrations of material. Landfill waste also creates greenhouse gas (GHG) emissions that contribute to climate change. Organic waste decomposes anaerobically (without using oxygen) in a landfill, which produces methane gas, a GHG that has approximately 23 times greater greenhouse gas effect than carbon dioxide. In addition, sending recyclable materials to a

landfill is a missed opportunity to recapture their “embedded” energy — the energy expended in extracting raw materials and creating these items from scratch.

Waste reduction and recycling efforts are thus proven tools to reduce greenhouse gas emissions along with material waste. They are also opportunities to raise awareness about environmental sustainability and the importance of changing behaviors. Murrieta seeks to continue the success of its efforts to divert waste from landfills. In anticipation of further State requirements, Murrieta should look to create a commercial recycling program that would promote recycling and diversion of solid waste from landfill by requiring businesses, nonresidential properties, and commercial buildings to source separate recyclable materials from all other solid waste for recycling and diversion from landfill and provide for the collection of recyclable materials.

Green Building

Green building, either for new construction or retrofits for existing buildings, can greatly reduce the impacts associated with conventional building practices. Green buildings are designed to save energy and water, reduce waste, minimize air pollution (including greenhouse gas emissions), and create healthier and safer indoor environments. Green buildings also aim to reduce impacts to the site vicinity, by reducing development footprint impacts and encouraging native plantings that contribute to local ecosystems.

Municipalities are in the position to effect significant change in the adoption and success of green building practices, either by creating standards or incentivizing green building — for instance, by removing barriers within City codes or review processes. Murrieta intends to encourage the application of green building practices within the community that will lead the way through the upgrade of municipal facilities.

Although the State of California incorporates a set of green building practices into its building standards code, the field of green building will continue to advance. Murrieta can stay abreast of current techniques and save more natural resources by encouraging green construction, where feasible, to go beyond state standards.

8.5 GOALS AND POLICIES

NATURAL ENVIRONMENT

Water Supply

GOAL CSV-1	**A community that conserves, protects, and manages water resources to meet long-term community needs, including surface waters, groundwater, imported water supplies, storm water, and waste water.**

POLICIES

CSV-1.1 Encourage the provision of a safe and sufficient water supply and distribution system.

CSV-1.2 Promote the maximization of water supplies through conservation, water recycling, and groundwater recharge.

CSV-1.3 Promote the protection of groundwater supplies from contamination.

CSV-1.4 Support water purveyors in promoting a City-wide recycled water system through project review and coordination with water districts.

CSV-1.5 Encourage the owners of hot springs to protect and enhance them.

CSV-1.6 Coordinate water resource management with water districts and regional, state, and federal agencies.

GOAL CSV-2 Murrieta promotes compliance with requirements from the State and appropriate agencies regarding comprehensive water conservation measures in buildings and landscaping.

POLICIES

CSV-2.1 Ensure that all developments comply with water efficiency requirements, as mandated by the applicable Building Code.

CSV-2.2 Work with water districts to encourage and incentivize the retrofitting of building systems, both indoor and outdoor, with water-conserving fixtures and appliances.

CSV-2.3 Continue to utilize the programs and assistance of regional and State water agencies to increase water conservation throughout the City and Sphere of Influence.

CSV-2.4 Promote water efficient landscaping practices through outreach efforts, project review, and enforcement of City, regional, or State code requirements.

CSV-2.5 Consider streamlining municipal regulations pertaining to landscaping so that applicability and requirements are easily understood.

CSV-2.6 Continue to participate in the Home Energy Opportunity (HERO) Program, which helps homeowners reduce energy bills and decrease water consumption through special financing options.

CSV-2.7 Provide information to residents on water consumption rebates and water conservation-related education provided by the various water districts serving the City.

Storm Water Management and Groundwater Recharge

GOAL CSV-3 **A community that participates in a multi-jurisdictional approach to protecting, maintaining, and improving water quality and the overall health of the watershed.**

POLICIES

CSV-3.1 Collaborate with partner agencies and other communities to conserve and properly manage surface waters within the City and Sphere of Influence through protection of the watershed and natural drainage system.

CSV-3.2 Promote storm water management techniques that minimize surface water runoff in public and private developments.

CSV-3.3 Utilize low-impact development (LID) techniques to manage storm water through conservation, on-site filtration, and water recycling, and continue to ensure compliance with the NPDES permit.

CSV-3.4 Encourage the creation of a network of “green” streets that minimize stormwater runoff, using techniques such as on-street bio-swales, bio-retention, permeable pavement or other innovative approaches, as feasible.

CSV-3.5 Seek opportunities to restore natural watershed function as an added benefit while mitigating environmental impacts.

GOAL CSV-4 **Restoration of the natural function and aesthetic value of creeks, while providing flood control measures and opportunities for recreation.**

POLICIES

CSV-4.1 Prioritize creek preservation, restoration and/or mitigation banking along creeks as mitigation for environmental impacts.

CSV-4.2 Consider alternatives to hardlined bottoms and side slopes within flood control facilities, where technically feasible.

CSV-4.3 Preserve Warm Springs Creek and Cole Creek as a wildlife corridor, while accommodating flood control measures and passive recreation.

CSV-4.4 Retain and restore natural drainage courses and their function where health and safety are not jeopardized.

CSV-4.5 Support efforts for restoration, flood control, and recreation along Murrieta Creek, in coordination with regional and federal plans.

CSV-4.6 Seek funds and provide support for creek restoration, maintenance and protection through grant and mitigation programs, development entitlements, and non-profit organizations.

CSV-4.7 Continue to support the architectural enhancement of bridges over creeks as a scenic resource.

Hills and Ridges

GOAL CSV-5 Hills and ridges are protected for their environmental and aesthetic values.

POLICIES

CSV-5.1 Promote compliance with hillside development standards and guidelines to maintain the natural character and the environmental and aesthetic values of sloped areas.

CSV-5.2 Incorporate significant landform features into City parks and open space, where appropriate.

CSV-5.3 Maintain a register of cultural resources that includes landforms with cultural significance.

Mineral Resources

GOAL CSV-6 Mineral resources are managed responsibly with minimal impact to surrounding areas.

POLICIES

CSV-6.1 Ensure compliance with City regulations that seek to prevent or minimize potentially adverse effects of mining, and provide for reclamation of mined lands.

Paleontological Resources

GOAL CSV-7 **Paleontological resources are conserved as a record of the region's natural history.**

POLICIES

CSV-7.1 Continue development review procedures that protect paleontological resources.

CSV-7.2 Encourage local display and educational use of paleontological resources.

Biological Resources

GOAL CSV-8 **Conservation of biological resources through habitat preservation and restoration, in coordination with other regional efforts and in compliance with state and federal mandates.**

POLICIES

CSV-8.1 Facilitate the conservation of habitat areas and wildlife corridors under the Western Riverside Multiple Species Habitat Conservation Plan.

CSV-8.2 Address applicable policies and regulations of regional, State, and Federal agencies to achieve common goals for preservation of habitat and the protection of threatened and endangered species.

CSV-8.3 Work with public and private land owners to conserve biological resources.

CSV-8.4 Review development projects to determine their impact on biological resources, and compliance with state and federal regulations.

CSV-8.5 Address Western Riverside Multiple Species Habitat Conservation Plan policies to preserve jurisdictional, wetland, vernal pool and other areas whose hydrology supports habitat and species identified for conservation in the Plan.

CSV-8.6 Address Western Riverside Multiple Species Habitat Conservation Plan policies for an urban interface, to reduce the impacts from toxics, light, noise, invasive plant species and domestic predators (pets).

CSV-8.7 Establish an implementation program to clarify procedures for implementation of the Western Riverside Multiple Species Habitat Conservation Plan (MSHCP) Habitat Acquisition Negotiation Strategy (HANS) in the City and to provide

incentives to facilitate conservation with the MSHCP while recognizing private property rights.

BUILT ENVIRONMENT

Urban Ecology - Trees and Landscaping

GOAL CSV-9 **A community that promotes the growth of an urban forest and water-efficient landscaping, recognizing that plants provide natural services such as habitat, storm water management, soil retention, air filtration, and cooling, and also have aesthetic and economic value.**

POLICIES

CSV-9.1 Identify and protect native trees, trees of historic or cultural significance, and mature trees, consistent with the Tree Preservation Ordinance.

CSV-9.2 Consider the establishment of street tree standards and a program for street tree planting, maintenance, and replacement.

CSV-9.3 Promote the use of street trees as a buffer between pedestrians and motorized traffic.

CSV-9.4 Encourage the planting of street trees in linear planting beds rather than tree wells in order to support long-living healthy trees.

CSV-9.5 Encourage the planting of trees in private yards and properties.

CSV-9.6 Maintain a guide to preferred trees, shrubs, and ground cover plants of non-invasive species, or refer private parties to an existing guide that meets City needs to assist private landscaping efforts.

CSV-9.7 Allow edible landscaping such as fruit trees, plants that provide foraging opportunities for wildlife, and community gardens on public and private property.

CSV-9.8 Encourage any new landscaped areas requiring permits to respect and incorporate the distinctive elements of the existing community landscape, including the retention of existing trees, to the maximum extent feasible.

CSV-9.9 Promote the use of native plant species in public landscaping of parks, schools, medians and planter strips, as well as in private development throughout the City.

CSV-9.10 Promote and expand the use of drought-tolerant green infrastructure, including street trees, and landscaped areas as part of cooling strategies in public and private spaces.

Agriculture

GOAL CSV-10 Fresh food is grown locally and made available through multiple venues that maintain a link to the City's agricultural heritage and promote healthy eating.

POLICIES

CSV-10.1 Allow agricultural uses to continue in rural residential areas.

CSV-10.2 Consider ways to allow small-scale urban agriculture in parks, schools, and neighborhoods.

CSV-10.3 Ensure that residents are permitted to grow fruits and vegetables in their yards, so long as there are not significant negative impacts to adjacent property owners.

CSV-10.4 Encourage and support the use of public lands for community gardens and other food production facilities, when feasible.

CSV-10.5 Support opportunities for local food production and access, such as farmer's markets, community gardens, harvest sharing programs, and community-supported agriculture programs.

CSV-10.6 Encourage local farmers to sell fresh food locally.

CSV-10.7 Allow public facilities such as schools, libraries, and community centers to be used as Community Supported Agriculture pick-up sites, where feasible.

Cultural Resources

GOAL CSV-11 Murrieta protects, enhances, and celebrates archaeological, cultural, and historic resources as a way to foster community identity.

POLICIES

CSV-11.1 Promote the protection and preservation of archaeological, cultural, historical, and architecturally significant sites, structures, districts, Native American resources, and natural features throughout the community, consistent with the

Cultural Resource Preservation Ordinance, SB 18 and AB 52. Preferred methods of protection include avoidance of impacts, placing resources in designated open space and allocation of local resources and/or tax credits as feasible.

CSV-11.2 Encourage appropriate adaptive reuse of historic structures and sites.

CSV-11.3 Promote the designation of eligible resources to the City Register of Cultural Resources, the County Landmarks Program, or other regional, state, or federal programs.

CSV-11.4 Encourage the development of programs to educate the community about Murrieta's historic resources and involve the community in historic preservation.

CSV-11.5 Comply with state and federal law regarding the identification and protection of archaeological and Native American resources, and consult early with the appropriate tribal governments.

CSV-11.6 Investigate the feasibility of establishing a museum or other repository to archive and display Murrieta's archaeological resources.

CSV-11.7 Maintain the position of archivist/historian at the Murrieta Public Library, and promote the Library's Heritage Room as a repository for historical information about the Murrieta area.

CSV-11.8 Promote the use of historic elements in City parks and public places.

CSV-11.9 Exercise sensitivity and respect for all human remains, including cremations, and comply with all applicable state and federal laws regulating human remains.

Energy

GOAL CSV-12 Energy conservation and the generation of energy from renewable sources is prioritized as part of an overall strategy to reduce greenhouse gas emissions.

POLICIES

CSV-12.1 Ensure that all developments comply with energy efficiency requirements as mandated by the applicable Building Code.

CSV-12.2 Work with energy utilities to encourage and incentivize the retrofitting of building systems with energy-conserving fixtures and appliances.

CSV-12.3 Support the on-site installation and use of renewable energy generation systems for residential, commercial, institutional, and industrial uses.

CSV-12.4 Explore options for addressing aesthetic concerns about renewable energy systems that do not unreasonably restrict the use of these systems, remaining consistent with State law.

CSV-12.5 Consider non-commercial solar power generation in residential areas.

CSV-12.6 Encourage new development projects and significant rehabilitation or expansion projects to incorporate innovative energy conservation or generation amenities such as electric vehicle charging stations, solar canopies, and carports.

CSV-12.7 Support bulk purchasing or financing packages of renewable energy purchasing for residential, business and government facilities.

CSV-12.8 Promote community awareness of opportunities to conserve energy and use renewable energy.

CSV-12.9 Support the U.S. Department of Energy Weatherization Assistance Program grant recipients' weatherization services and pursue California Weatherization Assistance Program grants and/or other funding sources that can help to provide weatherization services for local residents.

CSV-12.10 Support incentive programs including, but not limited to permit streamlining, permit fee reductions, or tax rebates to encourage the use of green roofs in residential and commercial buildings and/or the installation of solar photovoltaic (PV) carports in existing and future parking lots.

CSV-12.11 Implement, and amend as necessary, a Climate Action Plan.

Solid Waste

GOAL CSV-13 Solid waste is diverted from landfills through waste reduction, re-use and recycling.

POLICIES

CSV-13.1 Comply with the State's landfill diversion requirements.

CSV-13.2 Ensure that non-residential and multi-family developments provide readily accessible areas for recycling (at a minimum) paper, corrugated cardboard, glass, plastics and metals, as required by California law.

CSV-13.3 Maximize community reuse and recycling of products and materials through waste management contracts and public education.

CSV-13.4 Incentivize businesses that provide solutions for recycling and re-use of specific waste streams such as food waste and cooking oils.

CSV-13.5 Work with local landfills or green waste centers to develop the infrastructure for a composting program.

CSV-13.6 Provide public outreach and education workshops and information on the composting program.

CSV-13.7 Work with local landfills or green waste centers, or other interested parties, as appropriate, to implement a community-wide food scrap collection and composting program.

Green Building

GOAL CSV-14 A community that encourages and incentivizes the sustainable development of buildings and neighborhoods, particularly with respect to durability, energy and water use, and transportation impacts.

POLICIES

CSV-14.1 Ensure all applicable construction projects comply with the California State Green Building Standards Code.

CSV-14.2 Encourage the integration of other principles of green building into development standards and guidelines, looking for opportunities to realize other benefits such as improved health and increased bicycle transportation.

CSV-14.3 Identify and reduce regulatory barriers to green building.

CSV-14.4 Raise community awareness regarding green building methods, incentives, and benefits at community events, the planning counter, and on the City's website.

Municipal Operations

GOAL CSV-15 A community taking a leadership role in resource conservation and reduction of greenhouse gas emissions by implementing programs to improve municipal operations.

POLICIES

CSV-15.1 Consider renewable energy generation systems on City-owned property for use in municipal operations.

CSV-15.2 Reduce fuel consumption and emissions from municipal fleet vehicles.

CSV-15.3 Continue to implement waste reduction programs at municipal facilities.

CSV-15.4 Consider retrofitting and/or installing water- and energy-efficient fixtures and appliances in municipal facilities, where appropriate and feasible.

CSV-15.5 Encourage the use of recycled water where appropriate and feasible in City parks and landscaped areas, and demonstrate preferred techniques for water-efficient landscaping, including the use of native plants.

CSV-15.6 Demonstrate cutting-edge green building techniques when constructing and retrofitting municipal buildings.

CSV-15.7 Use energy-efficient lighting in parks, streets and other public places.

8.6 IMPLEMENTATION OF THE ELEMENT

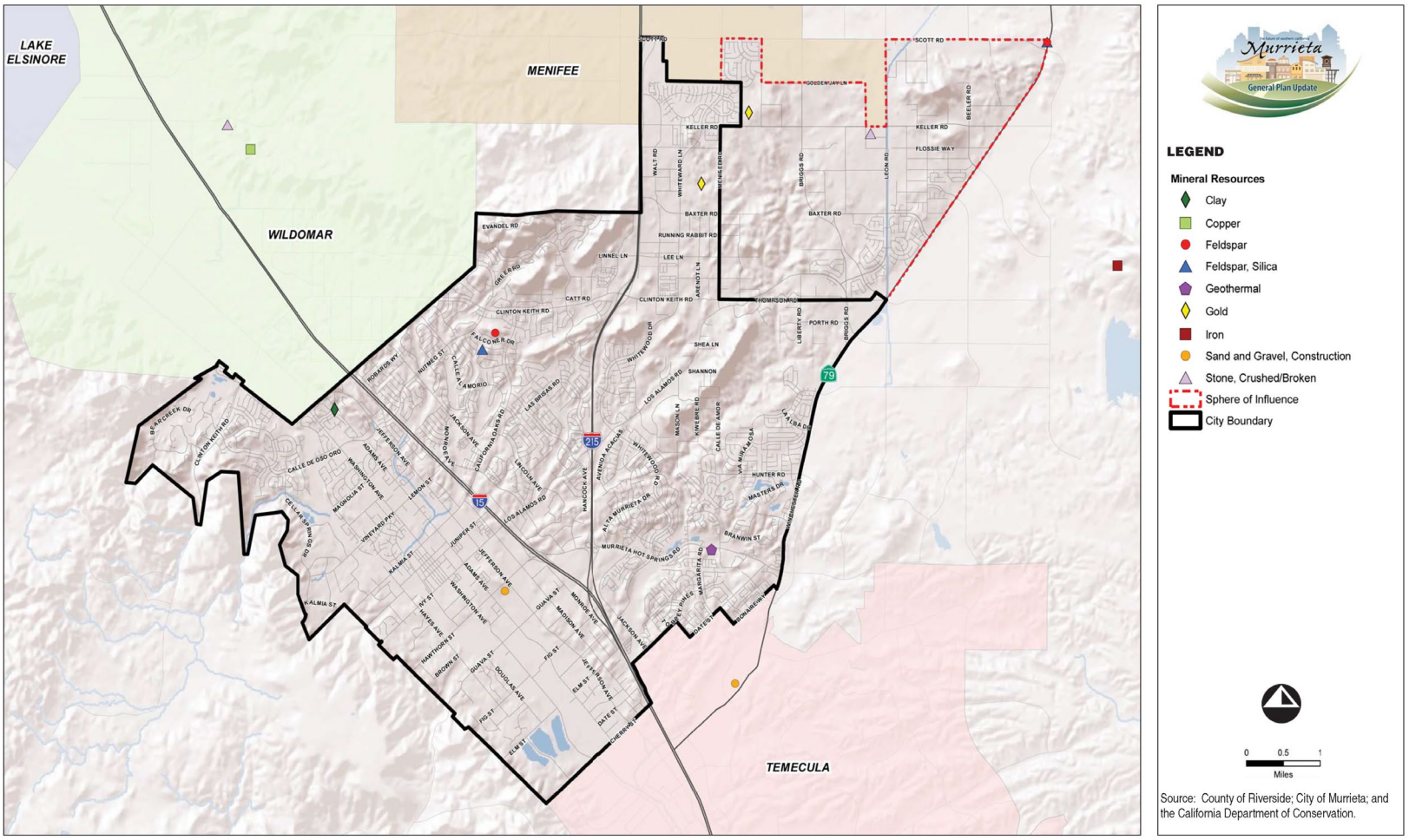
Natural resources are shared across jurisdictions and, therefore, conservation of these resources is an effort that is best accomplished through cooperative efforts between cities, counties, and various agencies. As called out in this Element, multi-jurisdictional plans pertaining to conservation include the Upper Santa Margarita Integrated Regional Water Management Plan (IRWMP) and Western Riverside Multiple Species Habitat Conservation Plan (MSHCP). Although implemented by public entities, both plans have implications for private development in Murrieta.

A number of City ordinances exist that promote conservation of natural and cultural resources in Murrieta through the regulation of private activity. These regulations are largely carried out through the development review process and development agreements. The Cultural Resources Ordinance requires proactive measures by the City of Murrieta Historic Preservation Advisory Commission in order to recognize and preserve historical and archaeological resources.

The City's CAP includes strategies and measures to reduce GHG emissions and will be implemented through the regulation of public and private activities in the City.

Businesses and residents in Murrieta are the end users of most resources, and they can be stewards as well. Education and outreach efforts to these community members by the City and its partners such as utility providers will go a long way toward conservation of Murrieta's valuable resources. The City of Murrieta can implement changes in its own operations to set an example for these efforts.

Exhibit 8-,1_Mineral Resources



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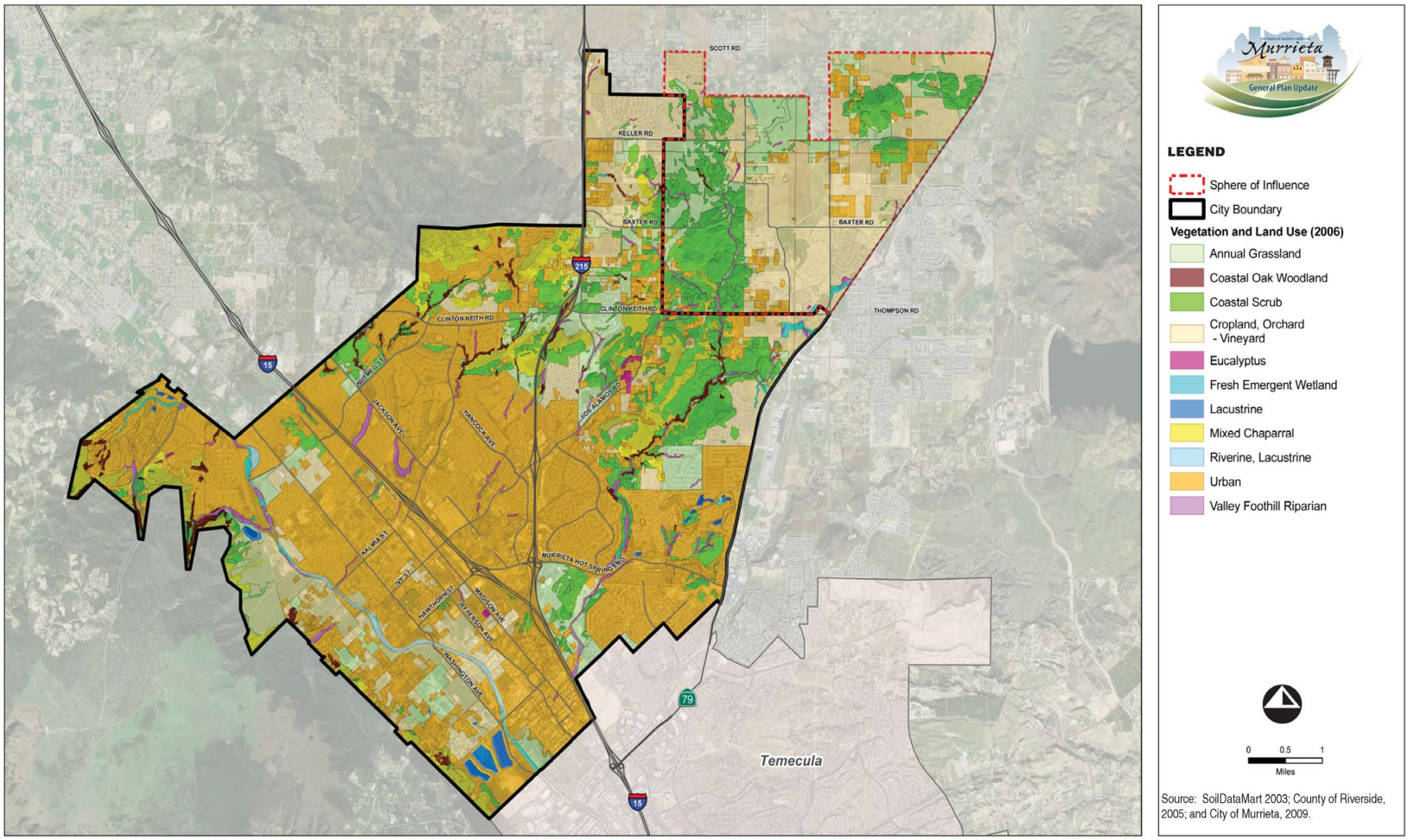
Mineral Resources

Exhibit 8-1

Exhibit 8-2, Vegetation and Land Use



LSA

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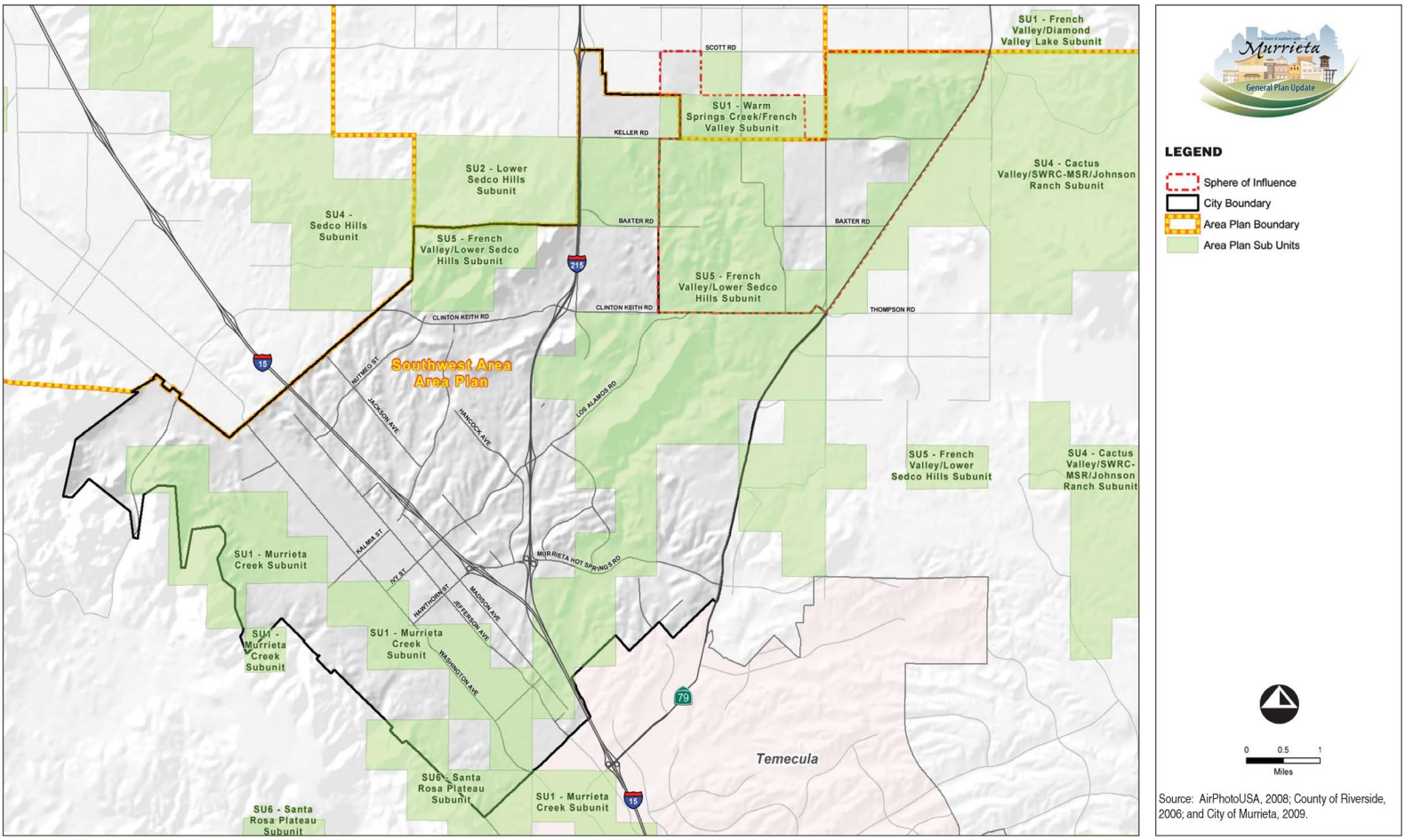
Vegetation and Land Use

Exhibit 8-2

Exhibit 8-3, MSHCP Area Plans and Subunit



LSA

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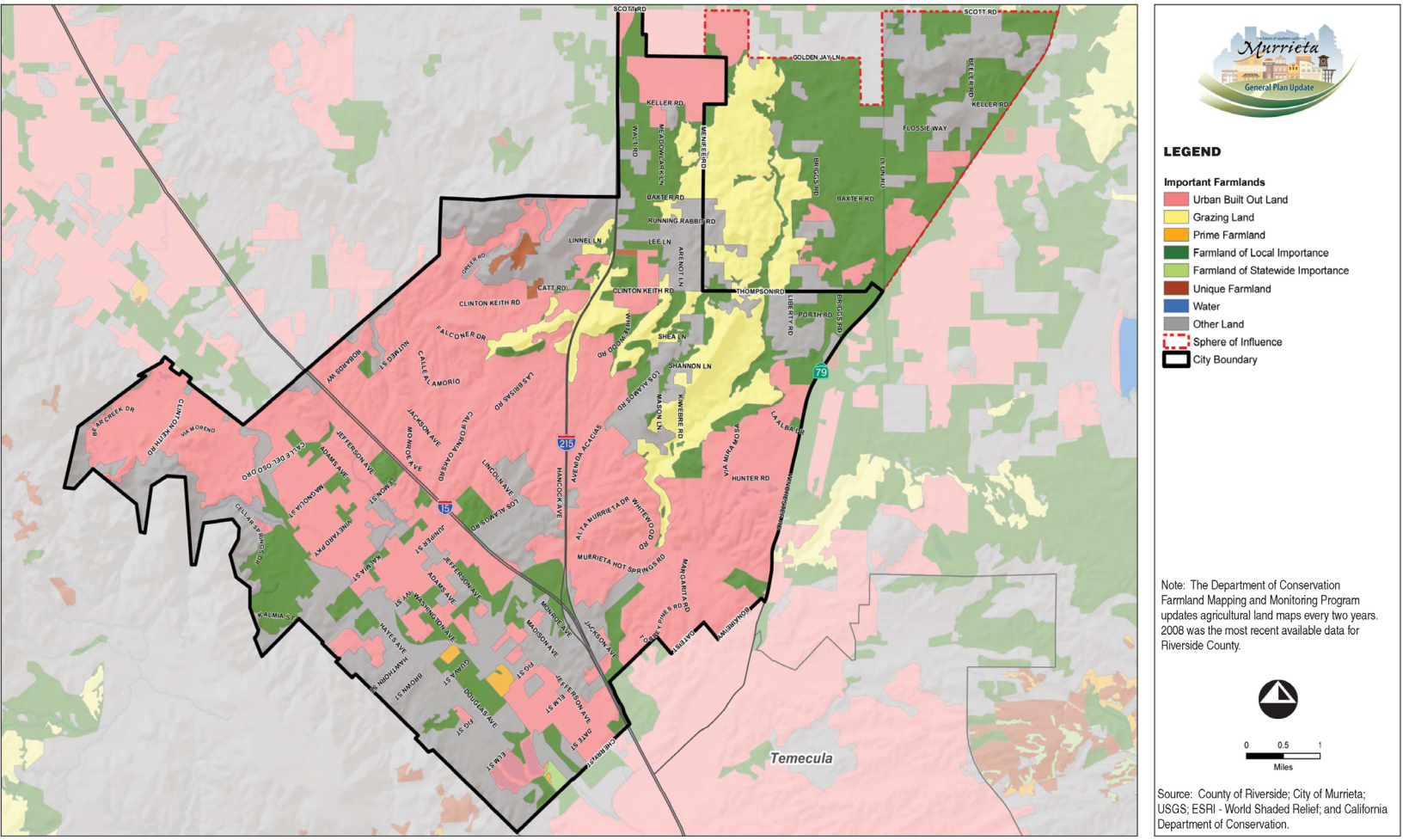
MSHCP Area Plans and Subunits

Exhibit 8-3

Exhibit 8-4, Important Farmland



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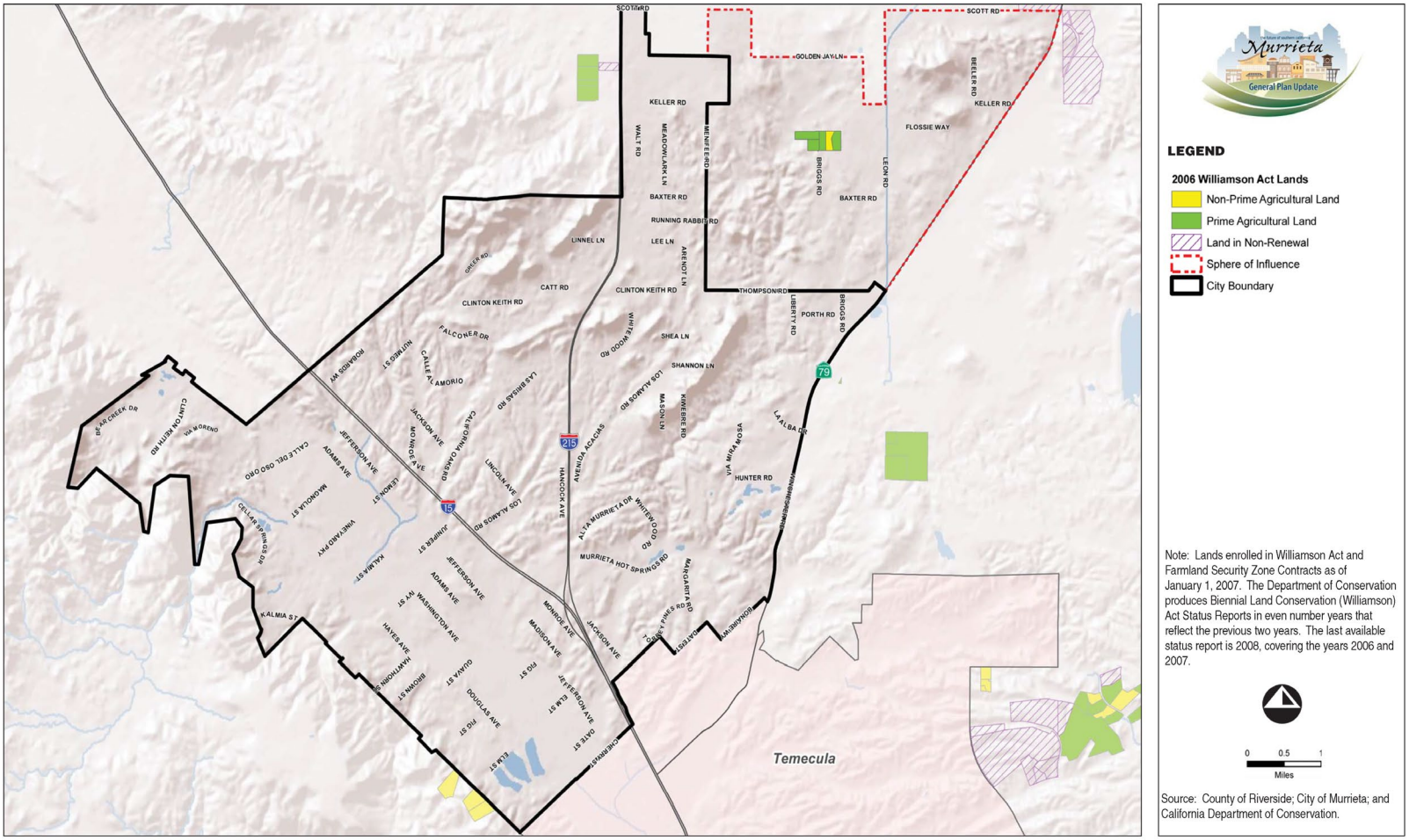
Important Farmland (2008)

Exhibit 8-4

Exhibit 8-5, Williamson Act Farmland (2007)



Chapter 9
Recreation & Open Space Element

9.1 INTRODUCTION

Surrounded by natural beauty, with hills and creeks within its borders, Murrieta is well positioned to provide opportunities for recreation, outdoor activities, and enjoyment of nature. Parks, recreation facilities, and trails promote health, and community members value them highly. Recreation programs such as classes and events offer a variety of benefits including health, education, and social interaction. Besides promoting aesthetic values, open space management and conservation can provide habitat, contribute positively to air and water quality, and protect residents from hazards such as fires and floods.

The following Community Priorities relate most directly to this Element:

- Protect the natural beauty of the mountains, hills, and waterways.
- Provide abundant parks and facilities for recreational activities, and cultural amenities.
- Provide ample activities for all ages of youth.

9.2 AUTHORITY FOR ELEMENT

California *Government Code* Section 65560(b)(3) stipulates that the General Plan address:

> *"…Open space for outdoor recreation, including but not limited to, areas of outstanding scenic, historic and cultural value; areas particularly suited for park and recreation purposes, including access to lakeshores, beaches, and rivers and streams; and areas which serve as links between major recreation and open-space reservations, including utility easements, banks of rivers and streams, trails, and scenic highway corridors…"*

9.3 SETTING THE CONTEXT: KEY ISSUES AND CHALLENGES

Recreation planning is guided by the *City of Murrieta Parks and Recreation Master Plan* (*Parks Master Plan*). The *Parks Master Plan* provides information about Murrieta's parks and recreation facilities. It also includes a needs assessment and gap analysis, recommendations for meeting current and future needs, and a financial implementation plan.

PARKLAND

The *Parks Master Plan* indicates that the City has 467.24 acres of parkland in 53 City parks. This total does not include joint use school facilities, some natural areas in Nature Parks, or private facilities. It includes six types of City Parks – City-Wide Parks, Community Parks, Neighborhood Parks, Neighborhood Play Areas, Special Use Parks, Native Parks – shown in *Exhibit 9-1, Parks,* and listed in *Table 9-1, Recreation Facilities Inventory*. *Table 9-1* reflects several new parks and facilities that have been added since the completion of the *Parks Master Plan*, and which increase the City's parkland acreage total.

Los Alamos Hills Sports Park is already Murrieta's largest active park, and will become larger as Phases 2 and 3 are completed.

The following facilities have been added, are in the design phase, or constructed since adoption of the *Parks Master Plan* in 2009:

- Torrey Pines Park (8.80 acres) – Neighborhood Park
- Vineyards (10 acres) – Neighborhood Park
- Grizzly Ridge Park (0.44 acres) – Neighborhood Play Area
- Murrieta Equestrian Park (21.98 acres) – Special Use Park

These facilities range in size from Neighborhood Play Areas that are at most 5 acres to City-Wide Parks with at least 50 acres of parkland. They include Special Use Parks, which are focused on one type of activity, and Nature Parks, which have limited improvements that provide public access to natural open space. Los Alamos Hills Sports Park is Murrieta's only City-Wide Park, with 45 acres of parkland developed in Phase 1.

Parkland Needs

The City has adopted a standard of 5 acres of parkland per 1,000 residents. As of June 2009, the City had a deficit of 34 acres according to this standard.The *Parks Master Plan* estimated that 240.3 acres of parkland would be needed for a population of 120,000 to meet identified needs for recreational facilities, in addition to what is needed to meet the parkland standard.

Table 9-1
Recreation Facilities Inventory

Recreational Facilities		Parkland Acreage	Passive Amenities															Active Amenities												
			Amphitheater	Barbeques	Bike Path/Walking Trail	Catch and Release Pond	Community Center/Recreation Room	Dog Park	Open Grass Areas	Parking Lot	Par Exercise Course	Picnic Tables	Restroom/Port-O-Lets	Shelters	Tot Lot/Playground Equipment	Multi-Purpose Trail/Trail Connection	Water Fountains	Baseball Field (with Mound)	Basketball Court	Concession Building	Football Field	Gymnasium	Horseshoe Pits	Skateboard Park	Soccer Field	Softball Field (without Mound)	Spray Turtles	Swimming/Wading Pool	Tennis Court	Volleyball Court
City-Wide Parks																														
1	Los Alamos Hills Sports Park	45.00		•	•				•	•		12	•	3	3	•	•	4L		•	3 L				6L					
Community Parks																														
2	Alderwood Park	9.00		•	•		•	•	•	•		•	•	•	•				•										•	
3	Alta Murrieta Sports Park	9.76		•					•	•		3	•		1		•	1L		•	1									
4	California Oaks Sports Park	19.99		•					•	•		6	•	1	1		•		2L					1	1P	2L/3		1	2	1
5	Copper Canyon Park	20.94		•	•		•		•	•		5	•	3	2	•	•	2	4H	•					2P					
6	Glen Arbor Park	18.92							•			2																		
7	Hunt Park	4.72					•		•	•		4	•				•	1L	1L			0.5				2			1L	
8	Mira Mosa Park	8.10		•	•				•	•		4	•	1	1		•	1	2H											
9	Pond Park	14.59			•	•			•			8	•																	
10	Torrey Pines Park	8.00		•	•			•	•	•		•	•	•	•			•												
Neighborhood Parks																														
11	Barratt Park	8.30			•				•		•				1	•														
12	Firefighters Park	3.21		•	•				•	•		9	•	2	1		•		2H								•			1
13	Mapleton Park	9.30		•	•				•	•		2	•	1	1	•	•		1H						1P	1				1
14	Mountain Pride Park	9.64							•	•		1	•													2P				
15	Murrieta Elementary School Park	4.26							•	•		3	•	1	1		•		1						1P	2				
16	Northstar Park	14.00		•					•			4		1	1		•								1P	1P				
17	Pioneer Park	.30		•						•		•		•	•															
18	Rancho Acacia Park	10.11		•	•				•		•	8		1	1	•	•								1P	1P				
19	Shady Maple Park	4.79							•	•		2		1	1		•								1P	1P				
20	Valley Vista Park	6.50		•					•			6		1	1		•								1P					
21	Vintage Reserve Park	3.83		•					•	•		3			1		•								1P					
Neighborhood Play Areas																														
22	Antelope Hills Park – Active	5.31	•	•					•			11		1	1		•		2H											
23	Antigua Park	2.26							•						1		•													
24	Blackmore Ranch Park	1.14		•					•	•		2		1	1		•													
25	Calle Cipres Park	1.80							•			2			1		•													
26	Calle Estancia Park	2.83		•	•				•			•		1	1	•														
27	Carson Park	0.69							•								•													

Table 9-1 (continued)
Recreation Facilities Inventory

Recreational Facilities		Parkland Acreage	Passive Amenities															Active Amenities												
			Amphitheater	Barbeques	Bike Path/Walking Trail	Catch and Release Pond	Community Center/Recreation Room	Dog Park	Open Grass Areas	Parking Lot	Par Exercise Course	Picnic Tables	Restroom/Port-O-Lets	Shelters	Tot Lot/Playground Equipment	Multi-Purpose Trail/Trail Connection	Water Fountains	Baseball Field (with Mound)	Basketball Court	Concession Building	Football Field	Gymnasium	Horseshoe Pits	Skateboard Park	Soccer Field	Softball Field (without Mound)	Spray Turtles	Swimming/Wading Pool	Tennis Court	Volleyball Court
Neighborhood Play Areas – continued																														
28	Century Park	3.90			•				•		•	4			1	•	•													
29	Creekside Village Green Park	4.00							•			4		1	1	•	•		2H											
30	Crystal Aire Park	1.11		•					•			2																		
31	Eastgate Park	1.50													1		•													
32	Echo Canyon Park	3.07							•			2			1		•													
33	Grizzly Ridge Park	0.44		•					•			1		1	1															
34	Meadowridge Park	4.29		•	•				•			3			1	•	•													
35	Montafino Park	0.76							•						1		•													
36	Monte Vista Park	1.06		•	•				•			2					•		2H											
37	Oak Terrace Park	0.20							•			2			1		•													
38	Oak Tree Park	0.32							•						1															
39	Palomar Park	1.75		•					•			2		1	1		•													
40	Rosewood Park	0.41							•																					
41	Springbrook Park	0.29		•					•			1			1		•													
42	Sycamore Park	2.66							•						1		•		1H											
43	Whitewood Park	1.84							•			5		1			•													
Special Use Parks																														
44	B Street Station	.50								•	•	•		•															•	
45	Murrieta Equestrian Park	22								•			•																	
46	Sykes Ranch Park	2.61		•	•				•	•	10				1	•	•													
47	Town Square Park	4.22	•		•		•		•	•							•													
Nature Parks																														
48	Bear Valley Park 1	20.14			•				•							•														
49	Bear Valley Park 2	3.97			•				•																					
50	Cole Canyon Park	140.00			•											•														
51	Falcon's View Park	9.37			•											•														
52	Oak Mesa Park	5.98																												
53	Warm Springs Park	23.80			•					•						•							•							
	Total Acreage	**489.68**																												

Definitions:
L = Lighted; P = Practice Field; and H = Half Court.

Access to Parkland

Besides seeking an adequate quantity of parkland, the City seeks to locate parks within convenient distance of neighborhoods throughout Murrieta. There are six residential areas that the *Parks Master Plan* identified as outside the ½-mile service area of any Neighborhood Park or Neighborhood Play Area. However, proximity to joint use school sites was not considered in that analysis, and those sites are located in at least two of the areas indicated as underserved.

RECREATION AND COMMUNITY FACILITIES

Recreation facilities include sports fields and courts, buildings for indoor recreation, and other facilities that accommodate recreation activities. Murrieta's parks offer a range of recreation facilities, listed in *Table 9-1*. Special Use Parks offer different amenities than other types of parks. For instance, Murrieta Equestrian Park (formerly Murrieta Stud Ranch) has equestrian arenas, a barn, stables, and open pasture.

Additional public recreation facilities are found in school campuses and in community facilities. Murrieta residents also have access to private recreational facilities, some of which are used for City recreation programming.

The former Murrieta Stud Ranch, pictured here in 2009 as it was being acquired by the City, has become a Special Use Park for equestrian activities.

Joint Use Facilities

A joint use agreement between the City and the Murrieta Valley Unified School District provides a framework for the City to access the recreation facilities of all school campuses except the continuation and independent study high schools; and for the District to access California Oaks Sports Park, Copper Canyon Park, Community Center, and Senior Center. Future facilities acquired or constructed by either party may be added to the list of facilities included in the agreement.

Through this agreement, 11 District sports fields become City parks in evenings and on weekends, and the District has exclusive access to certain City fields and parks adjacent to school campuses during the school day.[1] The agreement also grants the City further use of District sports fields, as scheduled in semi-annual meetings of the two parties. The City and District may use each other's facilities besides sports fields through an application process, giving each other first priority after their own use (including events that they sponsor, or by affiliated or related groups).

[1] "Joint Use Agreement for School and Municipal Facilities between Murrieta Valley Unified School District and the City of Murrieta," effective August 1, 2009.

The City and District may assist organizations such as youth sports leagues and school booster clubs to access joint use facilities. In addition to the Joint Use Agreement, community sports organizations can make separate agreements with the District to use school facilities.

Community Center

The Murrieta Community Center is located near Town Square at 41810 Juniper Street. This facility, built in 1979, provides office space for the Community Services Department and a 3,600-square foot multipurpose room. The multipurpose room has a theatrical stage and a kitchen, and can accommodate 250 people. However, there are no room dividers, so it can only be programmed with one class or activity at a time.

The need for additional community centers was identified as a key issue in the *Parks Master Plan*. Specifically, the *Parks Master Plan* calls for community centers that serve youth, multi-generational families, and older adults with a variety of activities and programs as well as opportunities for supervised free play.

Senior Center

The Senior Center opened in 2006, and has a 2,000 square foot multipurpose room, 1,200-square foot lounge, educational room with computers, and offices. The multipurpose room is used for classes, workshops, and meals. Visitors can use the computers in the educational room when a class is not in session.[2]

Besides providing a gathering place for Murrieta's seniors, the Senior Center aims to provide opportunities for learning; workshops on arts, crafts, and other hobbies; exercise programs; and information and services from organizations serving seniors.

Town Square Park has a large lawn and stage that are suited for community-wide events.

Community Event Space

Murrieta offers indoor and outdoor spaces for community events that are held by the City, residents, and organizations. Community members may reserve the Community Center, Town Square Park, and some Library facilities for events, as well as picnic shelters at several City parks. Community Center amenities are described above. Town

[2] City of Murrieta, "Senior Center," http://www.murrieta.org/services/senior/senior.asp, accessed December 10, 2009.

Square Park provides space for community events in its amphitheater and large open turf area. The Library has a community room with adjacent garden that may be reserved for events. There is also an amphitheater at Antelope Hills Park.

Program Space

Recreation facilities make it possible for the City to offer recreation programs. Community Services programs are held at the Community Center and a nearby annex; Senior Center; Youth Center; Hunt Field; Town Square Park; and in Copper Canyon Park, which has classroom space. Programs are also held in Murrieta schools and private facilities.[3]

Facility Needs

Murrieta has an identified need for the following additional recreation facilities in order to meet current and future demand:

- Swimming pools
- Sports facilities, including:
  - Baseball fields
  - Soccer fields
  - Softball fields
  - Tennis courts
- Off-leash dog areas
- Gymnasiums and indoor basketball courts

Facilities are planned that will help meet the needs for community centers, gymnasiums, and indoor basketball. Future plans for Los Alamos Hills Sports Park call for a 20,000-square foot community center that may include a gymnasium and outdoor facilities, including a swimming pool and tennis courts. The youth center at the California Oaks Sports Park also is planned to include a gymnasium in phase 2.

Recreation Programs

In fiscal year 2018-19, the Community Services Department served over 59,790 participants with its programs and activities. Senior programs drew the greatest number of participants, followed by gymnastics, aquatics, and dance. Other recreation offerings include sports, toddler, art and music, health and fitness, martial arts, camp, and teen programs. The City also holds a number of community events throughout the year, such as celebrations for major holidays.

The *Parks Master Plan* process produced a priority list of recreation program needs but also advised that responding to changing demographics and recreation preferences is an ongoing process that will demand staff's continual attention and resources.

[3] *City of Murrieta Parks and Recreation Master Plan*, 2009.

Recreation Funding

Funding for capital improvements and additions to park and recreation facilities in the City of Murrieta comes from several sources. Fees on new development (development impact fees and developer special agreements) are a major source of funding to provide parks and recreation facilities for the residents of newly developing areas of the City. Other sources of funding include grant funds (including Community Development Block Grants) and contributions from the City's general fund reserves.

Funding for maintenance and operation of Murrieta park and recreation facilities and programs are provided by Community Services District funds, user fees for recreation programs and facility use, and the City's general fund.

OPEN SPACE

Murrieta had 1,216.95 acres classified as Open Space on the 2006 General Plan/Zoning Map within the City limits, as shown in *Exhibit 9-2*, *Open Space*.

Lands set aside for protection and conservation of natural resources are designated as open space. This may include steep hillsides with a slope of at least 50 percent, significant habitat areas, and creeks. Additionally, within Specific Plan areas, open space may be set aside to serve as buffer areas and drainage areas.

Some open space is found in conjunction with parkland, especially in Nature Parks. Nature Parks are distinguished from open space because they provide public access via trails. Up to 10 percent of a Nature Park can be improved for active recreation. However, most of the park is undeveloped and contains vegetation, topography, or features that are important to retain in their natural states. Murrieta has seven Nature Parks, the largest of which is Cole Canyon Park.

Trails

There are 16 multi-use trails within the City that provide opportunities to walk and ride through parkland and open space. These trails are shown in *Exhibit 5-1*, *Trails and Bikeways*, and are described in a guide produced by the City in 2006. Made of asphalt, concrete, native soil, or decomposed granite, these multi-use trails are all open to horses, bikes and pedestrians.

Multi-use trails allow walking, biking, and horseback riding around and through parks

The *Parks Master Plan* identifies the need to develop an effective, connected, multi-use trail system for walking, jogging, hiking, biking, and horseback riding. Community members repeatedly expressed the same sentiment in workshops for the General Plan Update.

9.4 SETTING THE VISION: KEY CONCEPTS AND VISION FOR GENERAL PLAN

PARKLAND

In general, a parkland acreage standard is the ratio upon which development fees and dedications can be based. Establishment of a standard creates an obligation to fund improvements that achieve the standard throughout the City. Murrieta's parkland standard of 5 acres per 1,000 people is the highest allowed under California's Quimby Act, which gives the City its authority to require fees or dedicated property to offset new development impacts on recreation facilities.

However, this standard will not provide enough parkland to accommodate all the recreational facilities that the General Plan 2035 population is anticipated to demand. In order to plan for future parkland needs, the City will need to look beyond the parkland standard. The City may also consider counting joint use facilities as parkland.

The *Parks Master Plan* identifies a number of undeveloped park sites within the City of Murrieta, as shown in *Exhibit 9-3, Park Site Opportunities*. Some of these park sites may ultimately be considered Nature Parks, for which a maximum of 10 percent of the park's acreage would meet the parkland acreage requirement and the remainder of the park would be considered open space.

RECREATION AND COMMUNITY FACILITIES

Murrieta has a need for additional recreation and community facilities and will need to keep up with greater demand as the population grows. *Table 9-2, Recreation Facility Recommendations for Current Needs*, details how current needs for recreation facilities can be accommodated in existing parks, joint use schools, and opportunity sites. Opportunity sites are a combination of parks that have been designed but not constructed, sites acquired by the City but not yet designed, and other sites with the potential for park use; their locations are shown in *Exhibit 9-3*.

The City will seek to meet needs for recreation and community facilities throughout Murrieta. Satisfaction of these needs can be pursued by acquiring and developing new sites, preferably in partnership with schools or private parties, but also through increased joint use of school sites, renovation and improvement of existing facilities, and building facilities in current or planned parks.

RECREATION PROGRAMS

Murrieta's recreation programs offer sports, activities, and experiences for participants of all ages. They promote health, provide opportunities to pursue interests and learn, and encourage social interaction. The City's special events provide opportunities for residents to meet each other and feel that they belong to a community. There is demand for more programming in arts and culture, for community events, and for youth programs, as well as for therapeutic recreation programs.

Table 9-2
Recreation Facility Recommendations for Current (2009) Needs

Recreation Facility Recommendations for Current Needs	Passive Facilities					Athletic Facilities						
	Community Center	Dog Park/Off Leash Dog Area	Picnic Tables with Shade Shelter	Playground/Tot Lot	Spray Play Elements	Baseball	Gymnasium	Skate Park	Soccer	Softball	Swimming Pool	Tennis Court
Existing Parks and Facilities												
Antigua Park			4	R								
Barratt Park				R								
Calle Estancia Park			4	1								
California Oaks Sports Park				R	●				1		R	2L
Century Park				R								
Copper Canyon Park					●				1			
Firefighters Park				R								
Glen Arbor Park		●										
Hunt Park							R					
Los Alamos Hills Sports Park (Phase 1)									2AF			
Mapleton Park			4	R	●							
Meadowridge Park			4	R								
Montafino Park				R								
Murrieta Elementary School Park										1L		
Oak Tree Park			4	R								
Rancho Acacia Park				R								
Shady Maple Park				R								
Sycamore Park			4									
Whitewood Park		●										
Subtotal in Existing Parks	**0**	**1***	**24**	**1**	**3**	**0**	**0.5**	**0**	**4**	**0**	**0.5**	**2**
Joint Use Schools												
Murrieta Elementary School						1						
Warm Springs Middle School						2			2			
Thompson Middle School						1			1			
Murrieta Valley High School												7
Vista Murrieta High School												8
Murrieta Mesa High School						●			●		1	
Subtotal in Joint Use Schools	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**3**	**0**	**1**	**16**

Table 9-2 [continued]
Recreation Facility Recommendations for Current (2009) Needs

Recreation Facility Recommendations for Current Needs	Passive Facilities					Athletic Facilities						
	Community Center	Dog Park/Off Leash Dog Area	Picnic Tables with Shade Shelter	Playground/Tot Lot	Spray Play Elements	Baseball	Gymnasium	Skate Park	Soccer	Softball	Swimming Pool	Tennis Court
Opportunity Sites												
Planned Facilities												
Designed												
California Oaks Sports Park Expansion (Phase 3)	1						1					
Cherry Street Park						4			4			6
Golden Cities Park	0.5			1		1						
Second Avenue Park	0.5		4									
Torrey Pines Park		●	4	1		1						
Vineyards Park				1		1			2			
Not Designed												
Grizzly Ridge Park			6	1								
Los Alamos Hills Sports Park Expansion (Phase 2)				1				1		1		4
Los Alamos Hills Sports Park Expansion (Phase 3)	1	●			●		1				1	
Unplanned Facilities												
Calle Del Oso Oro Site		●										
City Parcel #1 – Nutmeg Site		●										
Town Hall Association Parcel		●										
Acquisition Sites												
Vineyard Specific Plan – developer property	●					●			●		●	●
Subtotal in Opportunity Sites	**3**	**4***	**14**	**5**	**0**	**7**	**2**	**1**	**6**	**1**	**1**	**10**
Total Recommended Additions:	**3.0**	**5***	**38.0**	**6.0**	**3.0**	**11.0**	**2.5**	**1.0**	**13.0**	**1.0**	**2.5**	**27.0**
Current Facility Needs From Exhibit 3.3-1 (Deficit):	**N/A**	**3.0**	**20.0**	**N/A**	**N/A**	**8.7**	**1.4**	**1.0**	**12.9**	**1.0**	**1.1**	**28.4**
Total Surplus/Deficit:	**N/A**	**N/A**	**18.0**	**N/A**	**N/A**	**2.30**	**1.10**	**0.00**	**0.00**	**0.00**	**1.40**	**-1.40**

● – Tentative or Unspecific Number
* – Candidate Locations

Definitions:
AF = Artificial Turf; L = Lighting; R = Renovate/Expand

Source: City of Murrieta Parks and Recreation Master Plan, 2009.

The availability of recreation facilities affects the City's ability to offer some types of programming that are in demand, such as swimming lessons and indoor fitness classes. Besides pursuing the construction of new facilities, the City can access additional facilities by working with private partners and through the joint use agreement with Murrieta Valley Unified School District. In locating programs, the City should consider how to make them convenient, accessible, and equitably distributed.

YOUTH

Children under 18 make up about one-third of Murrieta's population, and providing programs and facilities for youth is a community priority. For commuting parents, out-of-school care for children is especially important. The community can promote success in school by providing tutoring through the Library, at other venues such as the teen and senior centers, and on-site at school campuses. Youth programs should provide opportunities for physical activity and team sports, as well as a range of learning experiences including arts and environmental education.

Community members including youth have also asked for job training and jobs for teens. By preparing youth for careers, Murrieta can help maintain its skilled workforce. Youth mentoring programs can also be rewarding volunteer opportunities for the adults doing the mentoring.

For teens, events such as dances and battle of the bands are important social activities, while facilities such as the skate park provide spaces where they have a sense of ownership. The youth center meets a variety of facility and program needs, and teens are involved in overseeing it. Teen demand for a dance club could be met by encouraging a privately operated business or through frequent City- and school-sponsored dances.

Murrieta teens are enthusiastic about providing input to the City, as demonstrated in the General Plan Update youth visioning workshop at Vista Murrieta High School. The City of Murrieta has a Youth Advisory Committee, in which high school students provide input on recreation planning and addressing issues that affect teens in Murrieta. This is an example of the ways in which youth can be engaged in their community, while also developing leadership skills that can prepare them for the workforce.

OPEN SPACE

It is a community priority to protect the natural beauty of the mountains, hills, and waterways in and around Murrieta. Community members consider open space to be a treasure and would like to see natural areas retained in the future, while balancing preservation with development and understanding that some residents are concerned about property rights.

With over one-third of its land undeveloped and natural resources such as creeks and hills within its borders, Murrieta has opportunities to designate additional land as open space. Under the *Western Riverside Multiple Species Habitat Conservation Plan* (*MSHCP*), the City sets aside parcels as Conservation Land. These parcels contribute to large "Core Areas" of habitat in the northeast and southwest areas of the City and Sphere of Influence, and create "Linkages" between them along Murrieta Creek and Warm Springs Creek. To the southwest of Murrieta, open space connects to the Santa Rosa Plateau.

Other considerations for planning open space include recreation access and management of wildfire and stormwater.

TRAILS

The ability to bike and walk between Murrieta's multi-use trails, neighborhoods, and regional open space is a community priority and can be provided in different ways. Additional multi-use trails provide connectivity for the greatest variety of users, while off-street paved Class I bikeways accommodate all but equestrian users. On-street bikeways and sidewalks provide connectivity for bicyclists and pedestrians, respectively.

The Circulation Element provides goals and policies related to connecting multi-use trails to other paths for pedestrians and bicycles.

9.5 GOALS AND POLICIES

PARKS, RECREATION FACILITIES, AND COMMUNITY FACILITIES

GOAL ROS-1 Parkland is provided within a convenient distance from all residential areas, in a range of park types that meet different needs for active and passive recreation.

POLICIES

ROS-1.1 Maintain a minimum standard of 5 acres of local parkland per 1,000 population.

ROS-1.2 Create a strategy for providing sufficient parkland to accommodate needed recreation facilities through land acquisition, joint use, partnerships, and other means.

ROS-1.3 Provide City-Wide Parks, Community Parks, Neighborhood Parks, Neighborhood Play Areas, Special Use Parks, and Nature Parks in locations appropriate to their intended service areas, so that all residential areas are served by parks.

ROS-1.4 Involve the community in planning for parks.

GOAL ROS-2 Facilities that support recreation needs, programs, and community events are located throughout the City.

POLICIES

ROS-2.1 Pursue the development of active recreation facilities through improvements to parks and existing facilities as well as the development of facilities in new parkland.

ROS-2.2 Provide community centers, gymnasiums, and courts for indoor recreation programs in convenient, accessible, and equitably distributed locations.

ROS-2.3 Ensure that recreation facilities provide access and accommodations for users with a range of developmental, cognitive, and physical abilities.

ROS-2.4 Consider the installation of water fountains, toilets, and sinks in parks and recreation facilities.

GOAL ROS-3 City resources for parks and recreation facilities are leveraged through partnerships, joint use agreements, private facilities, outside funding, and community volunteers.

POLICIES

ROS-3.1 Maintain the joint use agreement with Murrieta Valley Unified School District and look for additional opportunities to partner in expanding resident access to shared facilities.

ROS-3.2 Continue to cooperate with school districts in locating schools to allow for park development adjacent to campuses.

ROS-3.3 Cooperate with federal, state, and county agencies to provide regional open space and recreation facilities for local residents.

ROS-3.4 Encourage the development of private and commercial recreation facilities.

ROS-3.5 Seek agreements and joint ventures with private entities to provide recreation facilities and activities.

ROS-3.6 Pursue support from federal, state, and private sources to assist with acquisition, design, and construction of parks and recreation facilities.

ROS-3.7 Promote a sense of community responsibility for maintaining and improving the parks and recreation system, and offer ways for individuals, groups, and businesses to invest time and resources in that effort.

RECREATION PROGRAMS

GOAL ROS-4 Recreation programs enrich the lives of residents across a broad spectrum of ages, interests, and abilities.

POLICIES

ROS-4.1 Seek resident involvement and feedback to create recreation programming that is relevant to a broad spectrum of community members.

ROS-4.2 Offer and encourage cultural arts programs and events that provide entertainment, such as concerts, as well as those that develop skills in dancing, drama, music, and the arts.

ROS-4.3 Use recreation programming to promote physical activity, healthy eating, and other healthy lifestyle habits.

ROS-4.4 Collaborate with other providers to expand therapeutic recreation programs for residents with special needs.

GOAL ROS-5 Recreation programs foster a sense of community and civic involvement, and promote interaction between residents.

POLICIES

ROS-5.1 Host special events that become community traditions, appealing to a range of ages.

ROS-5.2 Encourage events in the Town Square Park and Historic Downtown Murrieta.

ROS-5.3 Promote opportunities for multi-generational interaction such as youth mentoring by seniors and business people.

ROS-5.4 Create roles for volunteers to assist with recreation facilities and programs.

YOUTH FACILITIES AND PROGRAMS

GOAL ROS-6 Youth are a special focus of recreation facilities and programs.

POLICIES

ROS-6.1 Expand recreation programs for youth and teens, including before- and after-school care, sports and fitness, outdoor activity and excursions, camps, and arts education.

ROS-6.2 Use recreation programming to promote success in school.

ROS-6.3 Provide safe places for teens to socialize and participate in recreation activities.

ROS-6.4 Expand opportunities for youth to be involved in planning recreation programs, services, and events for youth.

ROS-6.5 Continue providing the Youth Advisory Committee for high school students.

OPEN SPACE

GOAL ROS-7 Open space areas are planned to protect, conserve, and utilize resources of unique character and value for the community.

POLICIES

ROS-7.1 Preserve and enhance open space resources in Murrieta.

ROS-7.2 Designate open space to preserve habitat and scenic views of natural areas.

ROS-7.3 Seek opportunities to designate open space along waterways, while also providing for the development of trails.

ROS-7.4 When possible, link open space and parks for the movement of wildlife and people.

GOAL ROS-8 New development is part of a coordinated system of open space, parkland, recreation facilities, and trails.

POLICIES

ROS-8.1 Encourage the provision of parks, recreation facilities, and/or open space in new development and redevelopment projects.

ROS-8.2 Ensure that new residential developments provide for recreation needs of residents through development fees and park dedication.

ROS-8.3 Encourage development that promotes outdoor activity.

ROS-8.4 When reviewing new development or redevelopment projects, refer to the Trails Plan to determine whether right-of-way is needed for trails on the project site.

GOAL ROS-9 **Public plazas or green spaces provide additional open space opportunities for existing and future residents and employees.**

POLICIES

ROS-9.1 Continue to require that adequate, usable, and permanent private open space is provided in residential developments.

ROS-9.2 Encourage new and existing commercial, office, and industrial development to provide outdoor green spaces that may be used by employees.

ROS-9.3 Encourage new development and redevelopment projects to incorporate gardens and green spaces with various cultural influences throughout the community to bridge cultures and provide education opportunities.

ROS-9.4 Encourage green spaces planted with a diverse plant palette in order to promote natural variety, ecosystem services, and enhance the well-being of community residents.

ROS-9.5 Review and modify as necessary, open space requirements for different types of development projects.

TRAILS

Refer to the Circulation Element Goal CIR-8 and related policies.

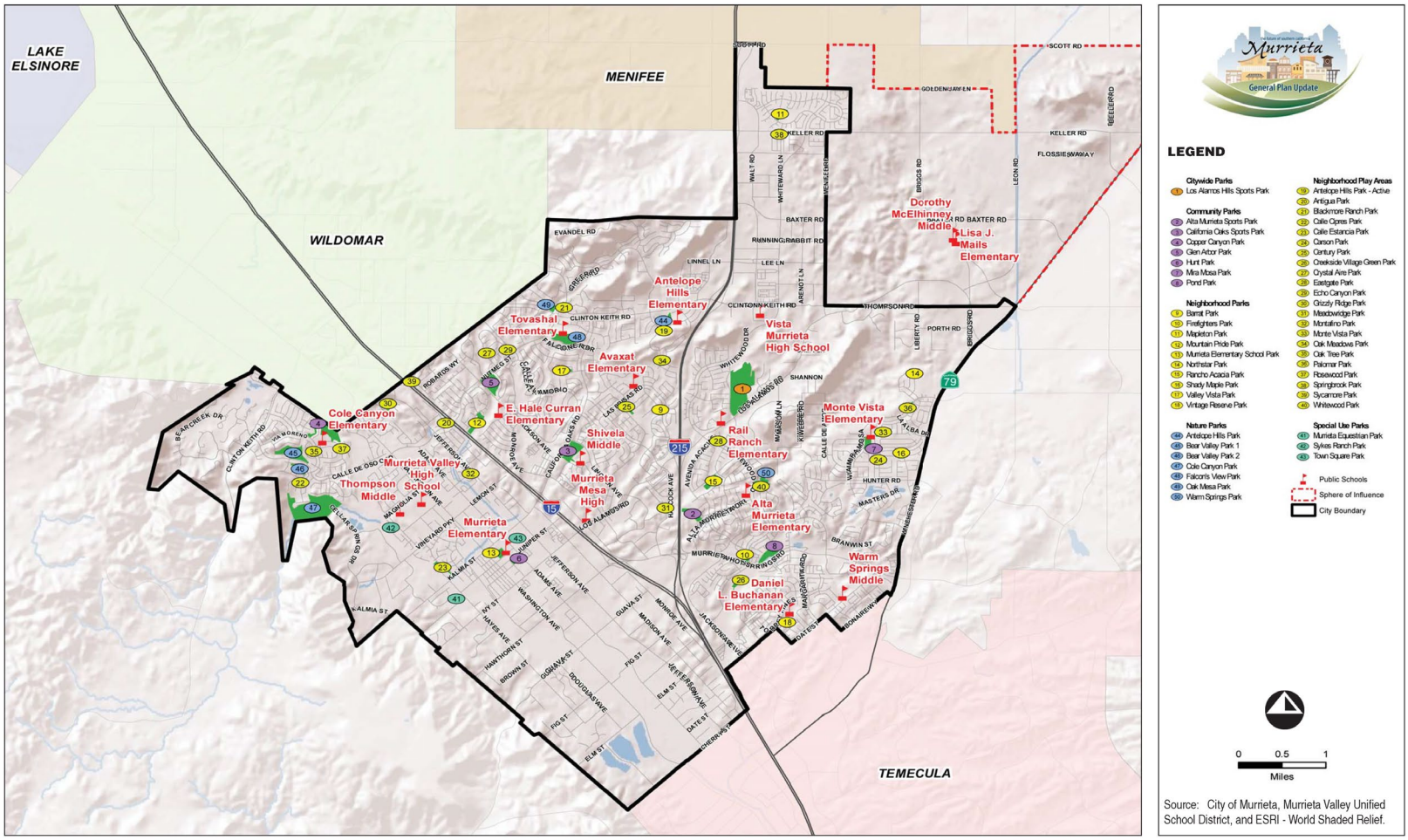
9.6 IMPLEMENTATION OF THE ELEMENT

The Recreation and Open Space Element is a policy document that requires the ongoing effort and actions of many segments of the community to implement. The Planning Commission and City Council, as major decision-making bodies, play an important role in its implementation. Other responsible parties include such City departments as the Community Development Department, Building Department, Public Works, and Community Service, whose day-to-day decisions are guided by the public policies in this document and the actions of the Parks & Recreation Commission.

The business and development community will do a fair share of the implementation as they incorporate plan policies into their various interests and projects. Murrieta residents should also be engaged in planning and providing for recreation and open space.

The City of Murrieta Parks and Recreation Master Plan is the implementation document that will guide City investments in parks and recreation.

Exhibit 9-1, Parks



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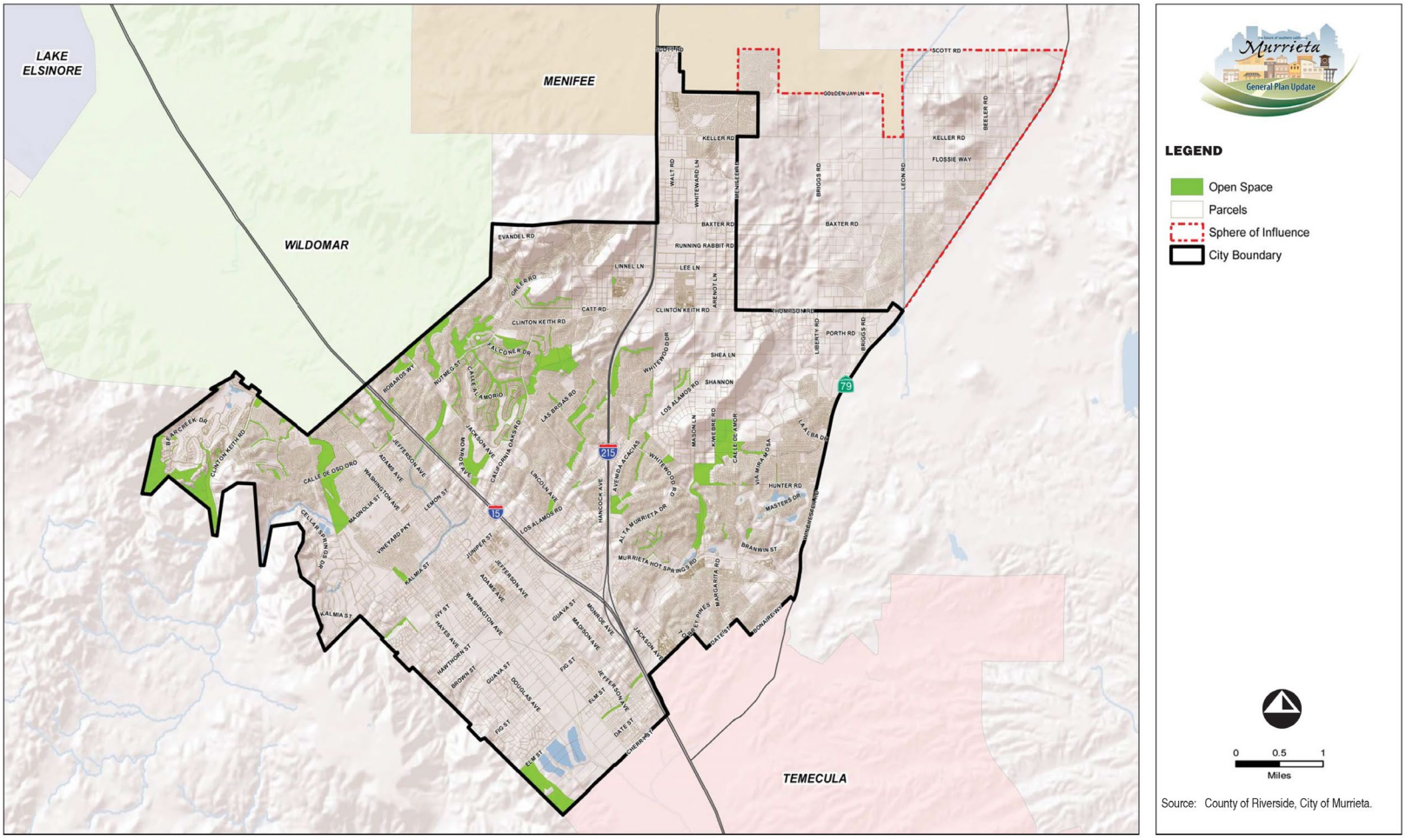
Parks

Exhibit 9-1

Exhibit 9-2, Open Space



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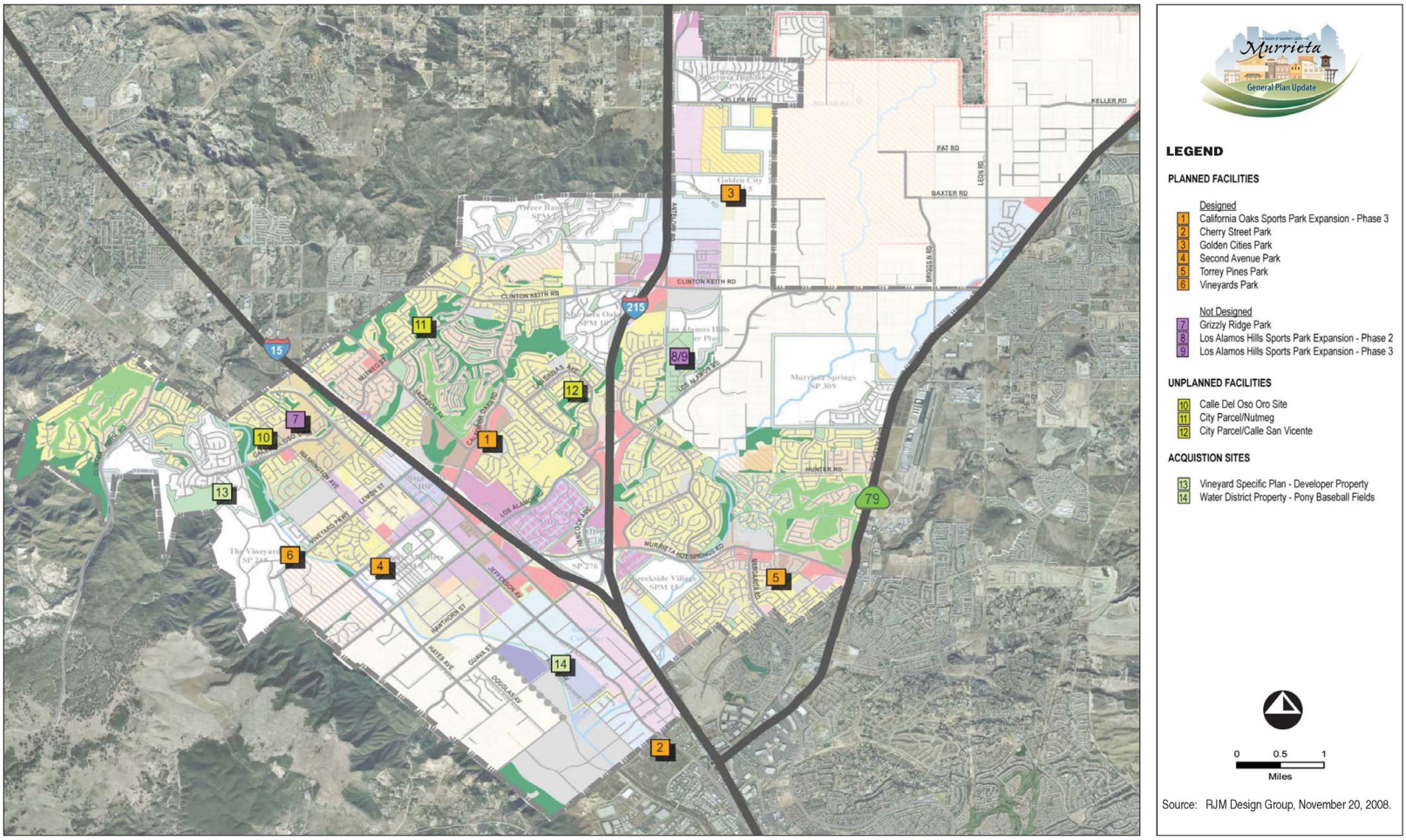
Open Space
Exhibit 9-2

Exhibit 9-3, Park Site Opportunities



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Park Site Opportunities
Exhibit 9-3

Chapter 10
Air Quality Element

10.1 INTRODUCTION

Recognizing the importance of air quality associated with the public's health and welfare and that air quality is a regional issue that extends beyond the jurisdictional boundaries of a city, Murrieta has chosen to include Air Quality as an optional Element within its General Plan. The Air Quality Element is intended to establish policy direction and implementation measures that allow the South Coast Air Basin to attain Federal and State air quality standards, as well as to protect Murrieta residents and businesses from the harmful effects of poor air quality. The Element establishes a number of programs to reduce current pollution emissions and to require new development to include measures to comply with air quality standards. This Element also contains provisions to address new air quality regulations and requirements. The City also prepared, maintains, and implements a Climate Action Plan, which addresses global climate change issues and the reduction of greenhouse gas emissions.

The City of Murrieta is located in the South Coast Air Basin (Basin), a 10,743-square mile area bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east. Regulatory oversight for air quality in the Basin rests with South Coast Air Quality Management District (SCAQMD) at the regional level, the California Air Resources Board (CARB) at the State level and the United States Environmental Protection Agency (U.S. EPA) at the Federal level. The SCAQMD monitors air quality at 37 monitoring stations throughout the Basin. Each monitoring station is located within a Source Receptor Area (SRA). The communities within an SRA are expected to have similar climatology and ambient air pollutant concentrations. The City of Murrieta is located in SRA 26 (Temecula Valley).

10.2 AUTHORITY FOR ELEMENT

Although Air Quality is not a required element, California *Government Code* Section 65303 authorizes cities and counties to adopt *"any other elements or address any other subjects, which, in the judgment of the legislative body, relate to the physical development of the county or city."* Once adopted, an optional element carries the same legal weight as any of the seven mandatory elements and must be consistent with all other elements. *Government Code* Section 65302(d), which provides the statutory requirements for the Conservation Element, also serves as the applicable *Government Code* section for the Air Quality Element. Further guidance is provided in the Office of Planning and Research's *2003 General Plan Guidelines* regarding the assessment of air quality impacts in General Plans.

10.3 SETTING THE CONTEXT: KEY ISSUES AND CHALLENGES

The following have been identified as key issues and challenges facing Murrieta in regards to air quality, its effects on the community, and how it can be addressed as the City continues to grow.

- **Air Quality.** Although air quality has steadily improved in the Basin in recent history, the Basin (including the City) is designated as a nonattainment area under State standards for one-hour ozone and under Federal standards is designated as nonattainment for eight-hour ozone. The Basin is nonattainment under both State and Federal standards for PM_{10}, and $PM_{2.5}$. Murrieta community members have identified "good air quality" as a treasure of the City, in comparison to other cities within the region. Maintaining and improving upon the existing air quality is a focus for Murrieta.

- **Land Use Patterns that Contribute to Air Pollutant Emissions.** Air pollutant emissions within the City of Murrieta are currently generated by stationary and mobile sources, with mobile sources accounting for the majority of emissions. Mobile sources of emissions refer to those moving objects that release pollution and include cars, trucks, buses, planes, trains, and motorcycles. Within the County of Riverside, vehicular sources are the largest contributor to the estimated annual average pollutant levels for reactive organic gas (ROG), carbon monoxide (CO), nitrogen oxide (NO_X), sulfur oxide (SO_X), and particulate matter less than 10 and 2.5 microns in diameter (PM_{10}, and $PM_{2.5}$, respectively). In Murrieta, mobile sources of emissions are primarily attributed to automobiles and trucks. Murrieta's urban form and street layout is primarily low-density and automobile-oriented with most uses separated from each other. These land use patterns support the use of low-occupancy vehicles and higher vehicle miles traveled. Many Murrieta residents travel outside the City for services, recreation, and amenities that could be provided more broadly within the City. Murrieta community members have identified 'traffic issues," "uncontrolled expansion," and "attracting new business and jobs" as challenges within the City.

- **Population Growth and Development.** Population growth and associated increases in vehicles and development within the City and surrounding region would further contribute to the amount of air pollutants in the City and the Basin. Murrieta community members have identified "growth," as well as increased "traffic and transportation issues" as challenges within the City.

- **Changing Regulations and Requirements.** As concerns over air quality continue to become more heightened, the regulatory agencies continue to investigate and implement policies and measures to achieve Federal and State standards for improved air quality. New and/or revised policies and guidelines require cities to be proactive in order to respond to these changes.

- **Health Impacts of Air Quality.** Air quality can directly impact a person's health. Sensitive populations (or sensitive receptors) are more susceptible to the effects of air

pollution than are the general population. Consideration regarding the placement of land uses is important in order to ensure that land uses that potentially emit harmful emissions are not located in proximity to sensitive receptors, such as residences, schools, playgrounds, childcare centers, athletic facilities, churches, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes.

10.4 SETTING THE VISION: KEY CONCEPTS AND VISION FOR GENERAL PLAN

Murrieta community members have acknowledged the City's air quality as a treasure and identified "stewardship of our good air" as a vision for the future. Maintaining good air quality is important for the physical health of the community, as well as for the City's economic health. Many of the visions identified by the community contribute to improved air quality. The following key concepts and vision for the General Plan directly guide the Air Quality goals and policies and are intended to respond to the key issues and challenges identified above:

- New Development and Balanced Growth
- Land Use Compatibility
- Maintain Coordination with Regulatory Agencies and Compliance with New Regulations and Requirements

Clear skies provide views of mountain ranges around Murrieta.

NEW DEVELOPMENT AND BALANCED GROWTH

Murrieta has one of the fastest growth rates in the state over the past 20 years. With opportunities for new development, it is anticipated that Murrieta will continue to grow. Focusing growth and providing a balance of land uses to meet the needs of the community will help contribute to a reduction in vehicle miles traveled and increase in non-motorized transportation, reducing mobile sources emissions. This can be achieved by developing a diverse mix of uses throughout the City, attracting a variety of employment opportunities to reduce the need for residents to commute for jobs, providing neighborhood retail and services near residential uses, and providing opportunities to shop, dine and recreate in Murrieta. It can also be achieved by creating attractive and safe pedestrian and bicycle facilities and by promoting high-quality transit service. This is consistent with the priorities articulated by the community, which include economic vitality by attracting higher education, growing a base of clean industry, improving roadway networks to reduce traffic, and providing a citywide system of bicycle lanes and recreational trails that improve accessibility without a car. Balancing land uses and growth will help to reduce air pollutant emissions, while at the same time contributing to achieving a sustainable economy.

LAND USE COMPATIBILITY

Murrieta can improve air quality by reducing the need for residents to make car trips outside the City

As Murrieta continues to grow and development becomes more concentrated, it will become increasingly important to consider land use compatibility as it pertains to sensitive populations. Sensitive populations (or sensitive receptors) are more susceptible to the effects of air pollution than the general population. Additionally, locating sensitive receptors (i.e., residences, schools, playgrounds, childcare centers, athletic facilities, churches, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes) in proximity to sources of air pollutants that emit Toxic Air Contaminants (TACs) can have significant health impacts. Land use compatibility and potential health impacts should be considered as part of the development review process. Addressing potential air pollutant impacts on sensitive receptors can be accomplished through the initial design phase of a development project, allowing for appropriate siting and identification of mitigation that minimize health impacts prior to construction. The General Plan guides development and establishes land use policies to avoid siting sensitive sites near sources of air pollution and to protect the health and safety of the Murrieta community.

MAINTAIN COORDINATION WITH REGULATORY AGENCIES AND COMPLIANCE WITH NEW REGULATIONS AND REQUIREMENTS

Rules, regulations, and guidelines to achieve Federal and State standards for improved air quality continue to change as new information and guidance becomes available. In order to maintain compliance with regulatory requirements, Murrieta will need to be proactive and monitor any updated rules and regulations from the SCAQMD, revisions to SCAQMD's CEQA Guidelines, and periodic updates to the Air Quality Management Plan (AQMP). General Plan policies encourage regional and local efforts to address air quality.

10.5 GOALS AND POLICIES

GOAL AQ-1 **Improved air quality through participation in regional and local efforts.**

POLICIES

AQ-1.1 Continue to work with the Western Riverside Council of Governments (WRCOG) Regional Air Quality Task Force to implement regional and local programs designed to meet federal, state, and regional air quality planning requirements.

AQ-1.2 Review and update City regulations and/or requirements, as needed, based on improved technology and new regulations including updates to the Air Quality Management Plan (AQMP), rules and regulations from South Coast Air Quality Management District (SCAQMD), and revisions to SCAQMD's CEQA Guidelines.

AQ-1.3 Cooperate with local, regional, State, and Federal agencies to achieve better transportation facility planning and development.

AQ-1.4 Cooperate with the State and Southern California Association of Governments (SCAG) in the implementation of SB 375 – Regional Transportation Planning, Housing, CEQA and GHG Reduction Strategies.

AQ-1.5 Provide public education and/or materials to educate and encourage residents and business owners to purchase/use low toxicity household cleaning products.

GOAL AQ-2 **The relationship between land use and air quality is considered in policy decisions in order to protect public health and improve air quality.**

POLICIES

AQ-2.1 Locate sensitive receptors (i.e., residences, schools, playgrounds, childcare centers, athletic facilities, churches, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes) away from significant pollution sources to the maximum extent feasible.

AQ-2.2 Avoid locating new homes, schools, childcare and elder care facilities, and health care facilities within 500 feet of freeways.

AQ-2.3 Consider air quality impacts from both existing and new development when making siting decisions.

AQ-2.4 Consult the California Air Resources Board's (CARB) Land Use and Air Quality Handbook and current environmental health research for the safe distances to sensitive land uses including schools, hospitals, elder and childcare facilities, or residences when new or expanded industrial land uses or other stationary sources of pollution are proposed, such as gas stations or auto body shops.

AQ-2.5 Work with developers and/or builders of any sensitive land uses, such as hospitals, to determine compliance with California Air Resources Board (CARB) standards and to ensure any future plans or expansions are in compliance, and encourage retrofits to the facility such as plantings or air filters to improve indoor air quality, if necessary.

AQ-2.6 Reduce and mitigate the potential impacts of adjacent incompatible land uses, where feasible, using buffers and other design techniques.

AQ-2.7 Encourage the planting of rows of fine-needle conifer trees along segments of freeways located in sensitive land use areas within 500 feet of I-215 and I-15. The trees shall be located on the side of the freeway that is between the receptors and the freeway segment. Specific tree species and site design parameters shall be evaluated at the time of development application to determine the most effective barriers for limiting toxic air contaminant exposure.

AQ-2.8 New buildings with indoor conditioned space located within 500 feet of I-215 and I-15 shall be equipped with particle filtration systems and devices, specifically high-efficiency filtration with mechanical ventilation or portable high efficiency air cleaners, to reduce indoor pollution concentrations as determined by a specialist certified by the American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE). An ongoing maintenance plan for the air filtration system shall be required.

AQ-2.9 Utilize adequate buffering and other land use practices to facilitate the compatibility between industrial and non-industrial uses.

AQ-2.10 New land uses that have the potential to generate stationary source emissions shall be required to obtain a permit from the South Coast Air Quality Management District.

GOAL AQ-3 Reduced emissions during construction activities.

POLICIES

AQ-3.1 Ensure that construction activities follow current South Coast Air Quality Management District (SCAQMD) rules, regulations, and thresholds.

AQ-3.2 Ensure all applicable best management practices are used in accordance with the South Coast Air Quality Management District (SCAQMD) to reduce emitting criteria pollutants during construction.

AQ-3.3 Require all construction equipment for public and private projects comply with California Air Resources Board's (CARB) vehicle standards. For projects that may exceed daily construction emissions established by the South Coast Air Quality Management District (SCAQMD), Best Available Control Measures will be incorporated to reduce construction emissions to below daily emission standards established by the SCAQMD.

AQ-3.4 Require project proponents to prepare and implement a Construction Management Plan, which will include Best Available Control Measures among others. Appropriate control measures will be determined on a project by project basis, and should be specific to the pollutant for which the daily threshold is exceeded. Such control measures may include but not be limited to:

- Minimizing simultaneous operation of multiple construction equipment units.
- Implementation of South Coast Air Quality Management District (SCAQMD) Rule 403, Fugitive Dust Control Measures.
- Watering the construction area to minimize fugitive dust.
- Require that off-road diesel powered vehicles used for construction shall be new low emission vehicles, or use retrofit emission control devices, such as diesel oxidation catalysts and diesel particulate filters verified by California Air Resources Board (CARB).
- Minimizing idling time by construction vehicles.

GOAL AQ-4 **Mobile source emissions are reduced by providing a balance of jobs and housing that serve the needs of the community.**

POLICIES

AQ-4.1 Cooperate with local, regional, State, and Federal agencies to reduce vehicle miles traveled (VMT) and consequent emissions through job creation.

AQ-4.2 Improve jobs/housing balance by encouraging the development, expansion, and retention of business.

AQ-4.3 Improve access of businesses to local institutions that provide education and job training to prepare local residents to fill the jobs local industries create.

AQ-4.4 Encourage a mix of housing types that are affordable to all segments of the population and are near job opportunities to further reduce vehicle trips.

GOAL AQ-5 **Air quality is improved through an efficient circulation system, reduced traffic congestion, and reduced vehicle miles traveled.**

POLICIES

AQ-5.1 Encourage employers to implement transportation demand management (TDM) measures, such as the following programs to reduce trips and vehicle miles traveled:

- Transit subsidies
- Bicycle facilities
- Alternative work schedules
- Ridesharing
- Telecommuting and work-at-home programs
- Employee education
- Preferential parking for carpools/vanpools

AQ-5.2 Re-designate truck routes away from sensitive land uses including schools, hospitals, elder and childcare facilities, or residences, where feasible.

AQ-5.3 Promote use of fuel-efficient and low-emissions vehicles, including Neighborhood Electric Vehicles.

AQ-5.4 Encourage the use of lowest emission technology buses in public transit fleets.

AQ-5.5 Provide a preference to contractors using reduced emission equipment for City construction projects as well as for City contracts for services (e.g., garbage collection).

AQ-5.6 Manage the municipal vehicle fleet to achieve the highest possible number of fuel-efficient and low emissions vehicles commercially available.

AQ-5.7 Reduce industrial truck idling by enforcing California's five (5) minute maximum law, requiring warehouse and distribution facilities to provide adequate on site truck parking, and requiring refrigerated warehouses to provide generators for refrigerated trucks.

GOAL AQ-6 Stationary source pollution (point source and area source) are minimized through existing and future regulations and new technology.

POLICIES

AQ-6.1 The City shall continue to minimize stationary source pollution through the following:

- Ensure that industrial and commercial land uses are meeting existing South Coast Air Quality Management District (SCAQMD) air quality thresholds by adhering to established rules and regulations.
- Encourage the use of new technology to neutralize harmful criteria pollutants from stationary sources.
- Reduce exposure of the City's sensitive receptors to poor air quality nodes through smart land use decisions.

AQ-6.2 Encourage and support the use of innovative ideas and technology to improve air quality.

AQ-6.3 Encourage non-polluting industry and clean green technology companies to locate to the City.

AQ-6.4 Work with the industrial business community to improve outdoor air quality through improved operations and practices.

AQ-6.5 New multi-family residential buildings and other sensitive land uses in areas with high levels of localized air pollution should be designed to achieve good indoor air quality through landscaping, ventilation systems, or other measures.

AQ-6.6 Encourage green building techniques that improve indoor air quality, energy efficiency and conservation in buildings, and utilization of renewable energy sources.

AQ-6.7 During the design review process, encourage the use of measures to reduce indoor air quality impacts (i.e., air filtration systems, kitchen range top exhaust fans, and low-VOC paint and carpet for new developments near busy roadways with significant volumes of heavy truck traffic).

GOAL AQ-7 Particulate matter and fugitive dust emissions are reduced throughout the City.

POLICIES

AQ-7.1 Adopt incentives, regulations, or procedures to reduce particulate matter.

AQ-7.2 Collaborate with transportation agencies, utilities, and developers to minimize fugitive dust and emissions from construction and maintenance activities.

AQ-7.3 Cooperate with local, regional, State, and Federal jurisdictions and/or agencies to better control fugitive dust from stationary, mobile, and area sources.

AQ-7.4 Consider the suspension of all grading operations, not including dust control actions, at construction projects when the source represents a public nuisance or potential safety hazard due to reduced visibility on streets surrounding the property.

10.6 IMPLEMENTATION OF THE ELEMENT

To meet State and Federal air quality goals requires commitment and involvement by all jurisdictions within the South Coast Air Basin. Protecting public health is a mutual goal shared by Murrieta, as well as other jurisdictions located within the Basin. Although an individual agency does not have the authority or jurisdiction to implement air quality measures for the larger region, local governments do have the legal authority and responsibility to direct policies and actions within their community. The City of Murrieta has established a policy program that addresses air quality through new development and balanced growth; land use compatibility; and coordination and compliance with regulatory agencies and new regulations/requirements. The responsibility of implementing the goals and policies of the Air Quality Element are assigned to the City's Community Development Department, and in some instances, this authority is shared with the South Coast Air Quality Management District (SCAQMD) and the South California Association of Governments (SCAG).

Chapter 11
Noise Element

11.1 INTRODUCTION

The Noise Element examines noise sources in the City to identify and assess the potential for noise conflicts and problems, and to identify ways to reduce existing and potential noise impacts. This Element addresses noise that affects the larger community, rather than noise associated with site-specific conditions. Existing and future noise from mobile and stationary sources are considered, as well as the compatibility of land uses and sensitive receptors. The Element identifies projected noise levels and contains goals and policies to maintain noise levels that are compatible with various types of land uses, as well as prevent high noise levels in sensitive areas. The regulatory framework, background information, and existing and future conditions can be found in the General Plan EIR.

11.2 AUTHORITY FOR ELEMENT

Government Code Section 65302(f) requires that a General Plan include:

> *"... a noise element which shall identify and appraise noise problems in the community. The Noise Element shall recognize the guidelines established by the Office of Noise Control in the State Department of Health Services and shall analyze and quantify… current and projected noise levels for all of the following sources: (1) highways and freeways; (2) primary arterials and major local streets; (3) passenger and freight on-line railroad operations and ground rapid transit systems; (4) commercial, general aviation, heliport, and military airport operations, aircraft overflights, jet engine test stands, and all other ground facilities and maintenance functions related to airport operation; (5) local industrial plants, including but not limited to, railroad classification yards; (6) other ground stationary noise sources identified by local agencies as contributing to the community noise environment."*

11.3 SUMMARY OF EXISTING STANDARDS AND CONDITIONS

Noise, defined as unwanted sound, is principally caused by the operation of machinery for transportation (automobiles, trucks, trains, and aircraft) and machinery for production (industry and construction). Noise affects the quality of the environment, both at home and work, as well as enjoyment of recreational activity. Excessive amounts of noise may have adverse affects on physical activity and psychological stability. The effect of noise on the individual and the community varies with its duration, intensity, and the tolerance level of the individual.

NOISE DESCRIPTORS

The standard unit of measurement of the loudness of sound is the decibel (dB). This unit expresses an exponential increase, where an increase of 10 decibels represents a tenfold increase in the sound generated. In order to describe “average noise levels,” the measurements are then weighted and added over a specified time period to reflect the magnitude of the sound, as well as its duration, frequency, and time of occurrence.

The sound pressure level is measured on a logarithmic scale. The 0 dB level is based on the lowest detectable sound pressure level that people can perceive (an audible sound that is not zero sound pressure level). The decibel scale has a value of 1.0 dB at the threshold of hearing and 140 dB at the threshold of pain. Each interval of 10 decibels indicates a sound energy ten times greater than before, which is perceived by the human ear as being roughly twice as loud. A 1.0-decibel increase is just audible, and a 10-decibel increase means the sound is perceived as being twice as loud as before. In most situations a 3 dB change in sound pressure level is considered a “just-detectable” difference and a 5 dB change (either louder or quieter) is readily noticeable.

Sound from a small localized source (approximating a “point” source) radiates uniformly outward as it travels away from the source in a spherical pattern. The sound level attenuates or drops-off at a rate of 6 dB for each doubling of the distance (6 dB/DD). This decrease, due to the geometric spreading of the energy over an ever-increasing area, is referred to as the inverse square law. However, highway traffic noise is not a single, stationary point source of sound. The movement of the vehicles makes the source of the sound appear to emanate from a line (line source) rather than a point when viewed over some time interval. Since the change in surface area of a cylinder only increases by two times for each doubling of the radius instead of four times associated with spheres, the change in sound level is 3 dB per doubling of distance.

Noise levels are expressed as A-weighted decibels (dBA), which adjusts the actual sound level to reflect only those frequencies audible to the human ear. The human ear is most sensitive to frequencies around 4,000 Hz (about the highest note on a piano) and less sensitive to low frequencies below 100 Hz (such as a low rumble). Other examples of the decibel level of various noise sources include: the quiet rustle of leaves (10 dBA), a soft whisper (20 to 30 dBA), the hum of a small electric clock (40 dBA), ambient noise outdoors or in a kitchen (50 dBA), normal conversation at five feet (55 dBA), and a busy street at 50 feet (75 dBA).

Examples of various sound levels are shown in *Exhibit 11-1*, *Sound Levels and Human Response*.

SCALES AND DEFINITIONS

Numerous methods have been developed to measure sound over a period of time. These methods typically include (1) the community noise equivalent level (CNEL); (2) equivalent sound level (Leq); and (3) day/night average sound level (Ldn). These methods are described in *Table 11-1*, *Noise Descriptors*.

Table 11-1
Noise Descriptors

Term	Definition
Decibel (dB)	The unit for measuring the volume of sound equal to 10 times the logarithm (base 10) of the ratio of the pressure of a measured sound to a reference pressure (20 micropascals).
A-Weighted Decibel (dBA)	A sound measurement scale that adjusts the pressure of individual frequencies according to human sensitivities. The scale accounts for the fact that the region of highest sensitivity for the human ear is between 2,000 and 4,000 cycles per second (hertz).
Equivalent Sound Level (L_{eq})	The sound level containing the same total energy as a time varying signal over a given time period. The L_{eq} is the value that expresses the time averaged total energy of a fluctuating sound level.
Maximum Sound Level (L_{max})	The highest individual sound level (dBA) occurring over a given time period.
Minimum Sound Level (L_{min})	The lowest individual sound level (dBA) occurring over a given time period.
Community Noise Equivalent Level (CNEL)	A rating of community noise exposure to all sources of sound that differentiates between daytime, evening, and nighttime noise exposure. These adjustments are +5 dBA for the evening, 7:00 PM to 10:00 PM, and +10 dBA for the night, 10:00 PM to 7:00 AM.
Day/Night Average (L_{dn})	The L_{dn} is a measure of the 24-hour average noise level at a given location. It was adopted by the U.S. Environmental Protection Agency (EPA) for developing criteria for the evaluation of community noise exposure. It is based on a measure of the average noise level over a given time period called the L_{eq}. The L_{dn} is calculated by averaging the Leq's for each hour of the day at a given location after penalizing the "sleeping hours" (defined as 10:00 PM to 7:00 AM), by 10 dBA to account for the increased sensitivity of people to noises that occur at night.
Single Event Noise Exposure Level (SENEL)	The Single Event Noise Exposure Level (SENEL) is the most appropriate noise level duration rating scale for a single noise occurrence. The SENEL, given in decibels, is the noise exposure level of a single event measured over the time interval between the initial and final times for which it exceeds the threshold noise level.
Exceedance Level (L_n)	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% (L_{01}, L_{10}, L_{50}, L_{90}, respectively) of the time during the measurement period.
Source: Cyril M. Harris, *Handbook of Noise Control*, 1979.	

SENSITIVE NOISE RECEPTORS

Sensitive populations are more susceptible to the effects of noise and air pollution than are the general population. Land uses considered sensitive by the State of California include schools, playgrounds, athletic facilities, hospitals, rest homes, rehabilitation centers, long-term care and mental care facilities. Some jurisdictions also consider day care centers, single-family dwellings, mobile home parks, churches, and libraries to be sensitive to noise. Generally, a sensitive receptor is identified as a location where human populations (especially children, senior citizens, and sick persons) are present, and where there is a reasonable expectation of continuous human exposure to noise.

Schools are a type of land use that is considered sensitive to noise.

According to the Murrieta Police Department, other than noise complaints associated with site-specific domestic activity, the majority of calls include complaints pertaining to commercial activities such as deliveries/loading docks, lot sweeping, employee activities (i.e., talking and music), and mowing.

Land uses less sensitive to noise are business, commercial, and professional developments. Noise receptors categorized as being least sensitive to noise include industrial, manufacturing, utilities, agriculture, natural open space, undeveloped land, parking lots, motorcycle parks, rifle ranges, warehousing, liquid and solid waste facilities, salvage yards, and transit terminals. These types of land uses often generate high noise levels. Moderately sensitive land uses typically include: multi-family dwellings, hotels, motels, dormitories, and outpatient clinics. Current land uses located within the City that are sensitive to intrusive noise include residential uses (particularly those in the vicinity of I-15 and I-215 Freeways), schools, hospitals, churches, and parks.

NOISE REGULATIONS

Noise Standards and Land Use Compatibility

The State of California General Plan Guidelines, published by the state Governor's Office of Planning and Research (OPR), provides guidance for the acceptability of specific land use types within areas of specific noise exposure. *Table 11-2*, *Land Use Compatibility for Community Noise Environments*, presents guidelines for determining acceptable and unacceptable community noise exposure limits for various land use categories. The guidelines also present adjustment factors that may be used to arrive at noise acceptability standards that reflect the noise control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution. OPR guidelines are

advisory in nature. Local jurisdictions, including the City of Murrieta, have the responsibility to set specific noise standards based on local conditions.

Table 11-2
Land Use Compatibility for Community Noise Environments

Land Use Category	Community Noise Exposure (CNEL)			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential-Low Density, Single-Family, Duplex, Mobile Homes	50 - 60	55 – 70	70 – 75	75 – 85
Residential – Multiple Family	50 – 65	60 – 70	70 – 75	70 – 85
Transient Lodging – Motel, Hotels	50 – 65	60 – 70	70 – 80	80 – 85
Schools, Libraries, Churches, Hospitals, Nursing Homes	50 – 70	60 – 70	70 – 80	80 – 85
Auditoriums, Concert Halls, Amphitheaters	NA	50 – 70	NA	65 – 85
Sports Arenas, Outdoor Spectator Sports	NA	50 – 75	NA	70 – 85
Playgrounds, Neighborhood Parks	50 – 70	NA	67.5 – 77.5	72.5 – 85
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50 – 70	NA	70 – 80	80 – 85
Office Buildings, Business Commercial and Professional	50 – 70	67.5 – 77.5	75 – 85	NA
Industrial, Manufacturing, Utilities, Agriculture	50 – 75	70 – 80	75 – 85	NA

CNEL = community noise equivalent level; NA = not applicable

NORMALLY ACCEPTABLE: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
CONDITIONALLY ACCEPTABLE: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features have been included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.
NORMALLY UNACCEPTABLE: New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise-insulation features must be included in the design.
CLEARLY UNACCEPTABLE: New construction or development should generally not be undertaken.

Source: Office of Planning and Research, California, *General Plan Guidelines,* October 2003.

City of Murrieta Noise Standards

The City of Murrieta's regulations with respect to noise are included in Chapter 16.30 of the *Development Code*, also known as the *Noise Ordinance*. Construction-related and operational noise restrictions are discussed below.

- **Construction Noise.** Section 16.30.130 of the City of Murrieta *Noise Ordinance* regulates construction noise. The *Noise Ordinance* prohibits noise generated by construction activities between the hours of 7:00 PM and 7:00 AM and on Sundays and holidays. Construction activities shall be conducted in a manner that the maximum noise levels at the affected structures will not exceed those listed in *Table 11-3*, *City of Murrieta Construction Noise Standards*.

Table 11-3
City of Murrieta Construction Noise Standards

Equipment Type	Single-Family Residential	Multi-Family Residential	Commercial
Mobile Equipment			
Daily, except Sundays and holidays, 7:00 AM to 8:00 PM	75 dBA	80 dBA	85 dBA
Daily, except Sundays and holidays, 8:00 PM to 7:00 AM	60 dBA	64 dBA	70 dBA
Stationary Equipment			
Daily, except Sundays and holidays, 7:00 AM to 8:00 PM	60 dBA	65 dBA	70 dBA
Daily, except Sundays and holidays, 8:00 PM to 7:00 AM	50 dBA	55 dBA	60 dBA
Source: City of Murrieta, *City of Murrieta Development Code Section 16.30.130*.			

- **Operational Noise.** Within the City of Murrieta, the *Noise Ordinance* governs operational noise generated between two properties and does not regulate noise from transportation sources, such as traffic, aircraft, and railways. Section 16.30.090 of the *Noise Ordinance* establishes the exterior noise standards for all receptor properties within a designated noise zone. The City's exterior noise level limits between properties are presented in *Table 11-4*, *City of Murrieta Exterior and Interior Noise Limits*.

Table 11-4
City of Murrieta Exterior and Interior Noise Limits

Noise Zone	Land Use (Receptor Property)	Time Period	Allowed Exterior Noise Level (dBA)
Exterior Noise Limits			
I	Noise-sensitive area	Anytime	45
II	Residential properties	10:00 PM to 7:00 AM	45
		7:00 AM to 10:00 PM	50
	Residential properties within 500 feet of a kennel(s)	7:00 AM to 10:00 PM	70
III	Commercial properties	10:00 PM to 7:00 AM	55
		7:00 AM to 10:00 PM	60
IV	Industrial properties	Anytime	70
Interior Noise Limits			
All noise zones	Multi-family residential	10:00 PM to 7:00 AM	40
		7:00 AM to 10:00 PM	45
Source: City of Murrieta, *City of Murrieta Development Code Section 16.30.090*.			

Section 16.30.090(B) of the *Development Code* further restricts noise levels. Section 16.30.090(B) states, in part:

> *No person shall operate or cause to be operated any source of sound at any location within the city or allow the creation of any noise on property owned, leased, occupied or otherwise controlled by a person that causes the noise level, when measured on any other property to exceed the following exterior noise standards:*
>
> 1. *Standard No. 1 shall be the exterior noise level which shall not be exceeded for a cumulative period of more than thirty (30) minutes in any hour. Standard No. 1 may be the applicable noise level from Table 11-4 above.*
> 2. *Standard No. 2 shall be the exterior noise level which shall not be exceeded for a cumulative period of more than fifteen (15) minutes in any hour. Standard No. 2 shall be the applicable noise level from Table 11-4 above, plus five dB.*
> 3. *Standard No. 3 shall be the exterior noise level which shall not be exceeded for a cumulative period of more than five minutes in any hour. Standard No. 3 shall be the applicable noise level from Table 11-4 above plus ten dB.*
> 4. *Standard No. 4 shall be the exterior noise level which shall not be exceeded for a cumulative period of more than one minute in any hour. Standard No. 4 shall be the applicable noise level from Table 11-4 above plus fifteen (15) dB.*
> 5. *Standard No. 5 shall be the exterior noise level which shall not be exceeded for any period of time. Standard No. 5 shall be the applicable noise level from Table 11-4 above plus twenty (20) dB.*

Section 16.30.100 sets forth interior noise levels limits for multi-family residential properties, as stated in *Table 11-4*. Section 16.30.100 states, in part:

> *No person shall operate or cause to be operated within a residential unit any source of sound, or allow the creation of any noise, that causes the noise level when measured inside a neighboring receiving residential unit to exceed the following standards:*
>
> 1. *Standard No. 1. The applicable interior noise level for cumulative period of more than five minutes in any hour;*
> 2. *Standard No. 2. The applicable interior noise level plus five dB for a cumulative period of more than one minute in any hour; or*
> 3. *Standard No. 3. The applicable interior noise level plus ten dB for any period of time.*

Vibration Standards

Vibration is the periodic oscillation of a medium or object with respect to a given reference point. Sources of vibration include natural phenomena (e.g., earthquakes, volcanic eruptions, sea

waves, landslides) and those introduced by human activity (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous, (e.g., machinery) or transient in nature (e.g., explosions). Vibration levels can be depicted in terms of amplitude and frequency relative to displacement, velocity, or acceleration. Vibration amplitudes are commonly expressed in peak particle velocity (PPV) or root-mean-square (RMS) vibration velocity. PPV is defined as the maximum instantaneous positive or negative peak of a vibration signal. PPV is typically used in the monitoring of transient and impact vibration and has been found to correlate well to the stresses experienced by buildings. PPV and RMS vibration velocity are normally described in inches per second (in/sec). Although PPV is appropriate for evaluating the potential for building damage, it is not always suitable for evaluating human response. The response of the human body to vibration relates well to average vibration amplitude; therefore, vibration impacts on humans are evaluated in terms of RMS vibration velocity. Similar to airborne sound, vibration velocity can be expressed in decibel notation as vibration decibels (VdB). The logarithmic nature of the decibel serves to compress the broad range of numbers required to describe vibration.

CEQA states that the potential for any excessive groundborne noise and vibration levels must be analyzed; however, it does not define the term “excessive” vibration. Numerous public and private organizations and governing bodies have provided guidelines to assist in the analysis of groundborne noise and vibration. The City’s *Development Code* Section 16.30.130(K) prohibits the operation of any device that creates vibration above the City’s established perception threshold of 0.01 in/sec over the range of one to 100 Hertz.

11.4 SETTING THE CONTEXT: KEY ISSUES AND CHALLENGES

LAND USE COMPATIBILITY

Land use decisions can have significant impacts on the noise environment. When determining the placement of land uses, it is important to consider the activities associated with potential uses and existing uses within the surrounding environment. Incompatible uses can impact the quality of life of the community. Policies in the General Plan, zoning regulations, and the City’s Noise Ordinance are implemented to ensure land use compatibility with respect to noise and locations of sensitive receptors throughout the City.

Noise Measurements

Noise measurements were taken throughout the City of Murrieta at 15 locations as illustrated in *Exhibit 11-2*, *Noise Measurement Locations*. Based upon the City’s development patterns and 2011 General Plan, the City was divided into Acoustical Analysis Zones (AAZ) to identify areas of homogenous acoustical conditions. Aerial imagery with a one-foot pixel resolution was utilized for a visual representation of the City’s roadway and land use layout.

The noise measurement locations were selected as a representative sample of the more urbanized portions of the City in order to identify ambient baseline levels. The noise measurements described in *Table 11-5*, *Noise Measurements*, were taken to identify ambient noise exposure in the City.

Table 11-5
Noise Measurements

Site No.	Location	Leq (dBA)	Lmin (dBA)	Lmax (dBA)	Peak (dBA)	Date and Time[1]
1	Corner of Elm Street and Madison Avenue	52.7	41.8	68.5	9.8	10:47 AM – 10:57 AM
2	Intersection of Arjay Drive and Estate Hill Way	41.9	33.1	57.8	79.0	11:21 AM – 11:31 AM
3	Intersection of Jefferson Avenue and Kalmia Street	58.4	49.6	72.3	102.0	11:52 AM – 12:02 PM
4	Cul-de-sac of Pomerado Court off of Douglas Avenue	51.3	41.9	72.1	89.4	12:16 PM – 12:26 PM
5	Cul-de-sac of Summit Park Center off of Vineyard Knoll Drive	49.9	35.7	71.0	89.9	12:45 PM – 12:55 PM
6	Cul-de-sac of Kilkare Circle off of Boldin Drive	47.8	40.4	64.1	87.7	1:30 PM – 1:40 PM
7	Intersection of Catalina Street and Chateau Drive	51.4	45.4	68.3	92.0	1:56 PM – 2:06 PM
8	Cul-de-sac of Kaelan Court off of Roland Road	47.1	38.7	65.7	94.9	3:10 PM – 3:20 PM
9	Cul-de-sac of Copperleaf Court off of Mimosa Drive	50.4	39.0	68.6	88.9	3:40 PM – 3:50 PM
10	Baxter Road off of Antelope Road (adjacent to Loma Linda Medical Center)	41.6	33.1	60.5	96.7	4:30 PM – 4:40 PM

Leq = equivalent sound level; dBA = A-weighted decibel.

1 - Each 10-minute measurement was taken during non-peak traffic hours because free flowing traffic conditions yield higher noise levels, as opposed to rush hour traffic during peak hours when vehicle speeds and heavy truck volumes are low.

Source: RBF Consulting, November 4, 2010.

Noise levels at the selected sensitive receptor sites were measured on November 4, 2010, using a Brüel & Kjær model 2250 sound level meter (SLM) equipped with Brüel & Kjær pre-polarized freefield microphone, which meets standards of the American National Standards Institute (ANSI) for general environmental noise measurement instrumentation. Each measurement was for 10 minutes, and the sound meter was calibrated prior to noise monitoring.

- **Measurement Site 1** was located at the corner of Elm Street and Madison Avenue. Sources of peak noise included vehicular noise from Elm Street, Madison Avenue, I-15, and I-215, an airplane, and truck horn. The noise level monitored at Site 1 was 52.7 dBA.

- **Measurement Site 2** was located at the intersection of Arjay Drive and Estate Hill Way. The monitored noise level was 41.9 dBA, with the majority of noise from traffic along Hayes Avenue, two airplanes, and a siren.

- **Measurement Site 3** was located at the intersection of Jefferson Avenue and Kalmia Street. The monitored noise level was 58.4 dBA with peak noise from traffic along Jefferson Avenue and Kalmia Street, and vehicles in the City Hall parking lot.

- **Measurement Site 4** was located at the cul-de-sac of Pomerado Court off of Douglas Avenue. Sources of peak noise included traffic along Douglas Avenue and an overhead aircraft. The monitored noise level was 51.3 dBA.

- **Measurement Site 5** was located at the cul-de-sac of Summit Park Center off of Vineyard Knoll Drive. The monitored noise level was 49.9 dBA. The source of peak noise included traffic along Clinton Keith Road and landscaping activities.

- **Measurement Site 6** was located at the cul-de-sac of Kilkare Circle off of Boldin Drive. The monitored noise level was 51.4 dBA. Sources of peak noise were from traffic along Kilkare Circle and three airplanes.

- **Measurement Site 7** was located at the intersection of Catalina Street and Chateau Drive. Sources of peak noise included traffic along Catalina Street, I-15, and I-215, and a siren. The monitored noise level was 51.4 dBA.

- **Measurement Site 8** was located at the cul-de-sac of Kaelan Court off of Roland Road. Sources of peak noise included a helicopter and an airplane. The monitored noise level was 47.1 dBA.

- **Measurement Site 9** was located at the cul-de-sac of Copperleaf Court off of Mimosa Drive. Sources of peak noise included an airplane, trucks, and maintenance activities. The monitored noise level was 50.4 dBA.

- **Measurement Site 10** was located along Baxter Road off of Antelope Road, adjacent to the Loma Linda Medical Center. The monitored noise level was 41.6 dBA and peak noise included traffic along I-215 and Antelope Road, and two airplanes.

MOBILE NOISE SOURCES

The most significant source of noise within the City is generated from mobile sources. In particular, freeway traffic (vehicles and trucks) and traffic on heavily traveled surface streets contribute the greatest amounts of mobile noise sources. The Murrieta community has identified traffic as a challenge, and has identified transportation, including improving accessibility without a car as a priority for the City.

Motor Vehicle Noise

The roadways within the City that generate the most traffic noise from vehicle and truck traffic include the major north-south trending I-15 and I-215 Freeways due to higher traffic volumes and vehicle speeds than other roadways. Major east-west arterials that generate significant noise include Jefferson Avenue and Washington Avenue. Major north-south arterials generating traffic noise include Clinton Keith Road, Kalmia Street/California Oaks Road, and Murrieta Hot Springs Road.

Vehicular noise along major roadways was modeled to estimate existing noise levels from mobile traffic. The existing and future roadway noise levels were projected using the FHWA Traffic Noise Prediction Model (RD-77-108), together with several roadway and site parameters. The FHWA model is based upon reference energy mean emission levels (REMELS) for automobiles, medium trucks (two axles) and heavy trucks (three or more axles), with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site. To predict CNEL values, it is necessary to determine the hourly distribution of traffic for a typical day and adjust the traffic volume input data to yield an equivalent hourly traffic volume. The California Vehicle Noise (Calveno) traffic noise emission curves are used as recommended by the California Department of Transportation (Caltrans) to more accurately calculate noise levels generated by traffic in California.

Traffic volumes used in the FHWA model were obtained from Iteris (January 2011). These traffic inputs determine the projected impact of vehicular traffic noise and include the roadway cross-section (e.g., number of lanes), roadway width, average daily traffic (ADT), vehicle travel speed, percentages of automobile and truck traffic, roadway grade, angle of view, and site conditions (hard or soft). The model does not account for ambient noise levels (i.e., noise from adjacent land uses) or topographical differences between the roadway and adjacent land uses. *Exhibit 11-3*, *Existing Roadway Noise Contours* and *Table 11-6*, *Existing Roadway Noise Levels*, indicates the location of the 60-, 65-, and 70-CNEL noise contours associated with vehicular traffic along local roadways as modeled with the FHWA computer model.

As shown in *Table 11-6*, the existing noise levels adjacent to City roadways range from a low of 45.2 CNEL along Guava Street from Madison Avenue to Monroe Avenue to a high of 72.9 CNEL along Murrieta Hot Springs Road from I-215 to Alta Murrieta Drive.

Table 11-6
Existing Roadway Noise Levels

Roadway Segment	Existing				
	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)		
			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour
Clinton Keith Road					
Southwest City Limits to Calle del Oso Oro	9,100	63.9	283	90	28
Calle del Oso Oro to Grand Avenue	11,100	65.9	448	142	45
Grand Avenue to Nutmeg Street	19,000	67.0	591	187	59
Nutmeg Street to Murrieta Oaks Road	27,300	68.6	848	268	85
Murrieta Oaks Road to I-215	27,040	68.6	842	266	84
I-215 to Antelope Road	5,281	58.9	91	29	9
Antelope Road to Meadowlark Road/Whitewood Lane	13,000	62.9	224	71	22
Calle del Oso Oro					
Clinton Keith Road to Calle Cipres	4,200	59.3	98	31	10
Calle Cipres to Washington Avenue	11,400	63.7	267	85	27
Nutmeg Street					
Washington Avenue to Adams Avenue	5,900	60.9	138	44	14
Adams Street to Jefferson Avenue	5,900	60.8	138	44	14
Jefferson Avenue to Jackson Avenue	9,300	62.8	218	69	22
Jackson Avenue to Clinton Keith Road	10,900	64.7	339	107	34
Lemon Street					
Washington Avenue to Adams Avenue	3,300	58.7	77	24	8
Adams Avenue to Jefferson Avenue	4,200	59.7	98	31	10
Kalmia Street					
Hayes Avenue to Washington Avenue	1,500	55.2	35	11	4
Washington Avenue to Adams Avenue	15,400	66.3	479	151	48
Adams Avenue to Jefferson Avenue	20,600	67.6	640	202	64
Jefferson Avenue to Madison Avenue	25,500	68.3	793	251	79
Madison Avenue to I-15	35,300	69.7	1,098	347	110
California Oaks Road					
I-15 to Monroe Avenue	29,500	68.8	918	290	92
Monroe Avenue to Jackson Avenue	29,200	68.7	908	287	91
Jackson Avenue to Hancock	24,900	67.0	584	185	58
Hancock to Clinton Keith Road	15,100	66.1	470	149	47

Table 11-6 [continued]
Existing Roadway Noise Levels

Roadway Segment	Existing				
	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)		
			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour
Ivy Street					
Hayes Street to Washington Avenue	900	48.7	8	2	1
Washington Avenue to Adams Avenue	8,900	63.9	277	88	28
Adams Avenue to Jefferson Avenue	9,500	64.2	295	93	30
Jefferson Avenue to Madison Avenue	11,300	64.8	351	111	35
Los Alamos Road					
Madison Avenue to Lincoln Avenue	10,400	64.5	324	102	32
Lincoln Avenue to Hancock Avenue	19,000	67.0	591	187	59
Hancock Avenue to I-215	19,200	67.1	597	189	60
I-215 to Whitewood Lane	23,000	66.6	538	170	54
Whitewood Lane to Ruth Ellen Way	3,800	59.3	89	28	9
Murrieta Hot Springs Road					
Jefferson Avenue to Madison Avenue	18,285	67.1	568	180	57
Madison Avenue to I-15	42,600	70.2	1,325	419	132
I-15 to I-215	65,100	71.9	2,022	639	202
I-215 to Alta Murrieta Drive	74,500	72.9	2,315	732	231
Alta Murrieta Drive to Jackson Avenue	48,000	71.0	1,492	472	149
Jackson Avenue to Whitewood Road	43,263	70.5	1,347	426	135
Whitewood Road to Margarita Road	51,200	71.3	1,591	503	159
Margarita Road to Eastern City Limits	40,000	70.2	1,244	393	124
Guava Street					
West of Hayes Avenue	500	49.2	9	3	1
Hayes Avenue to Douglas Avenue	700	50.5	12	4	1
Douglas Avenue to Washington Avenue	1,200	53.0	21	7	2
Adams Avenue to Jefferson Avenue	2,100	55.4	36	11	4
Jefferson Avenue to Madison Avenue	3,100	57.1	53	17	5
Madison Avenue to Monroe Avenue	200	45.2	3	1	0
Elm Street					
Adams Avenue to Madison Avenue	2,500	55.9	43	14	4

Table 11-6 [continued]
Existing Roadway Noise Levels

Roadway Segment	Existing				
	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)		
			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour
Hayes Avenue					
Nighthawk Way to Vineyard Parkway	1,900	54.8	33	10	3
Kalmia Street to Ivy Street	1,900	56.3	45	14	4
Ivy Street to Hawthorne Street	1,300	50.3	11	4	1
Hawthorne Street to Guava Street	700	50.5	12	4	1
Washington Avenue					
North of Calle del Oso Oro	10,000	63.2	234	74	23
Calle del Oso Oro to Nighthawk Way/Magnolia Street	14,300	64.8	335	106	34
Nighthawk Way/Magnolia Street to Vineyard Parkway	12,600	64.2	295	93	30
Vineyard Parkway to Kalmia Street	20,800	66.2	488	154	49
Kalmia Street to Ivy Street	8,300	58.3	71	23	7
Ivy Street to Hawthorne Street	1,400	53.6	24	8	2
South of Hawthorne Street	1,300	53.3	22	7	2
Jefferson Avenue					
North of Nutmeg Street	10,000	64.7	311	98	31
Nutmeg Street to Magnolia Street	9,000	62.8	211	67	21
Magnolia Street to Lemon Street	10,000	64.6	311	98	31
Lemon Street to Kalmia Street	11,200	65.0	348	110	35
Kalmia Street to Ivy Street	17,900	66.8	557	176	56
Ivy Street to Murrieta Hot Springs Road	12,000	65.1	373	118	37
Murrieta Hot Springs Road to Guava Street	27,800	68.7	864	273	86
Guava Street to Fig Street	28,000	69.9	1,131	358	113
Fig Street to Elm Street	29,000	70.1	1,172	371	117
South of Elm Street	20,736	67.4	644	204	64
Madison Avenue					
Kalmia Street to Ivy Street/Los Alamos Road	14,914	67.1	602	190	60
Ivy Street/Los Alamos Road to Murrieta Hot Springs Road	24,100	68.1	749	237	75
Murrieta Hot Springs Road to Guava Street	3,400	54.5	29	9	3
Jackson Avenue					
North of Nutmeg Street	7,100	61.7	167	53	17
Nutmeg Street to Monroe Avenue	14,900	64.9	349	110	35
Monroe Avenue to California Oaks Road	14,900	64.8	349	110	35

Table 11-6 [continued]
Existing Roadway Noise Levels

Roadway Segment	Existing				
	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)		
			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour
Hancock Avenue					
California Oaks Road to Las Brisas Road	14,700	64.7	345	109	34
Las Brisas Road to Los Alamos Road	19,550	66.0	458	145	46
Los Alamos Road to Murrieta Hot Springs Road	19,500	66.0	457	144	46
I-15					
City Boundary to Nutmeg Street	124,000	79.0	11,989	3,791	1,199
Nutmeg Street to Kalmia Street	124,000	79.0	11,989	3,791	1,199
Kalmia Street Los Alamos Road	127,000	79.1	12,268	3,879	1,227
Los Alamos Road to I-215	127,000	79.1	12,268	3,879	1,227
I-215 to Cherry Street	186,000	80.8	18,005	5,694	1,801
I-215					
Scott Road to Los Alamos Road	89,000	77.3	7,074	2,237	707
Los Alamos Road to Murrieta Hot Springs Road	91,000	78.3	8,803	2,784	880
Murrieta Hot Springs Road to I-15	83,000	77.9	8,024	2,537	802

ADT = average daily trips; dBA = A-weighted decibels; CNEL = community noise equivalent level

Source: Traffic noise modeling is based on traffic data provided by Iteris, January 2011.

Under existing conditions, very few areas (seven segments along Murrieta Hot Springs Road) within the City experience traffic noise levels in excess of 70 CNEL. The 70-dBA contour along these roadway links extends to a maximum of 231 feet from the roadway centerline. However, many of the City's commercial areas experience noise levels in excess of 65 CNEL adjacent to major arterial roadways and freeway rights-of-way. Residences located within this area may experience unacceptable noise levels. It should be noted that these are modeled traffic noise levels, and are not based upon actual site measurements.

Freeways typically result in greater noise levels than other roadways due to higher traffic volumes and vehicle speeds. As depicted on *Exhibit 11-3*, the I-15 and I-215 Freeways traverse the City of Murrieta and represent a primary source of traffic noise. The following describes the traffic volumes and general characteristics of the freeways within the City.

- **Interstate 15.** I-15 is a major regional transportation corridor that serves as the backbone of the transportation system connecting the major urban centers of San Diego County and San Bernardino County, while passing through the western portion of Riverside County. Based on traffic data from Iteris, ADT along the segments of I-15 that pass through Murrieta ranges from approximately 124,000 to 186,000 for both northbound and southbound traffic.

- **Interstate 215.** I-215 is a major regional transportation corridor that serves as the backbone of the transportation system connecting western Riverside County to the major urban center of San Bernardino County. Based on traffic data from Iteris, ADT along the segments of I-215 that pass through Murrieta ranges from approximately 83,000 to 91,000 for both northbound and southbound traffic.

Airport Noise

Off-road transportation noise is also generated by aircraft traffic from one nearby airport, the French Valley (Rancho California) Airport, located outside of the City's Sphere of Influence. Aircraft flyovers are heard occasionally in the City; however, the aircraft do not contribute a significant amount of noise heard in the City. The Riverside County Airport Land Use Commission has prepared a Comprehensive Land Use Plan for the French Valley Airport (CLUP), which experiences an average of 409 daily operations. The CLUP indicates that the 55 CNEL noise level contour extends slightly into the eastern part of the City along the westerly side of Winchester Road. The CLUP also designates portions of the City as being located within Compatibility Zones B1, C, D, and E, all of which require certain land use restrictions.

Railway Noise

Although there are currently no railway operations or associated noise sources within the City, opportunities to pursue future light rail transit and high speed rail are anticipated. The potential locations of these facilities have not been determined.

STATIONARY NOISE SOURCES

Stationary noise sources, including construction activities and commercial and industrial uses contribute to overall noise within the City. Existing and future noise associated with stationary noise will need to be considered. Residential land uses and areas identified as noise-sensitive must be protected from excessive noise from stationary sources including commercial and industrial centers. These impacts are best controlled through effective land use planning and application of the City *Noise Ordinance*.

Construction noise is one of the most common stationary noise sources in the City. The use of pile drivers, drills, trucks, pavers, graders, and a variety of other equipment can result in short, sporadic elevated noise levels. Although construction noise impacts are generally short-term in nature, it can often disturb nearby sensitive uses.

Commercial uses within the City are generally located along the I-15 and I-215 Freeway corridors, as well as other major roadways such as Jefferson Avenue, Madison Avenue, and Murrieta Hot Springs Road. The primary noise sources associated with commercial facilities are caused by delivery trucks, air compressors, generators, outdoor loudspeakers, and gas venting. Residential, institutional, and park uses are located adjacent to several commercial areas of the City. Commercial operations may cause annoyance to these nearby sensitive receptors.

The primary noise sources associated with these facilities are caused by mechanical equipment, loading and unloading of vehicles and trucks, and amplified communication. Industrial noise is generally limited to the immediate source area and only impacts sensitive receptors if there is an incompatible mix of land uses in the vicinity of the industrial facility. Therefore, proper planning, zoning, and enforcement of the Noise Ordinance are important factors in limiting the amount of disturbance to sensitive receptors from industrial noise sources.

POPULATION GROWTH AND DEVELOPMENT

Future population growth and development within the City will generate new and additional noise. As vacant and underutilized land is developed in Murrieta, it will be important to ensure land use compatibility with respect to noise and locations of sensitive receptors.

11.5 SETTING THE VISION: KEY CONCEPTS AND VISION FOR GENERAL PLAN

Protecting the public's health, safety, and welfare from unnecessary, excessive, and harmful noise is a key objective of the City. The following key concepts and vision for the General Plan directly guide the Noise Element goals and policies and are intended to respond to the key issues and challenges identified above:

- Mobile Sources
- Stationary Sources
- Noise Control Techniques
- City Noise Ordinance

Setbacks and landscaped walls can help to buffer residential uses from noise associated with roadways. Home construction techniques can

MOBILE SOURCES

Mobile sources are the most significant noise generators within Murrieta. The most efficient and effective means of controlling noise from transportation systems is to reduce noise at the source. However, the City has no direct control over noise produced by trucks and cars because of State and Federal preemption rules. Vehicular noise emissions standards are established at the State and Federal levels. Local agencies can play a part in reducing traffic noise by controlling traffic volume and congestion. Therefore, City noise programs focus on reducing the impact of transportation noise along freeways and arterial roadways and on site planning, landscaping, topography, and the design and construction of noise barriers to alleviate vehicular traffic noise impacts.

Motor Vehicle Noise

Future noise levels have been calculated for various roadway segments within the City of Murrieta. *Table 11-7*, *General Plan Buildout Roadway Noise Levels*, outlines the City's future roadway noise levels under proposed General Plan 2035 buildout conditions and *Exhibit 11-4*, *General Plan 2035 Noise Contours*, illustrates the proposed General Plan 2035 noise contours. As indicated in *Table 11-7*, 24 modeled roadway segments (along Clinton Keith Road, Kalmia Street, California Oaks Road, Los Alamos Road, Murrieta Hot Springs Road, and Jefferson Avenue, excluding freeway segments) would generate noise levels greater than 70 dBA CNEL at 100 feet from centerline.

Table 11-7
General Plan 2035 Roadway Noise Levels

Roadway Segment	Future 2035				
	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)		
			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour
Clinton Keith Road					
Southwest City Limits to Calle del Oso Oro	33,600	69.5	1,045	330	104
Calle del Oso Oro to Grand Avenue	25,600	69.5	1,034	327	103
Western City Limits to Nutmeg Street	56,000	71.7	1,740	550	174
Nutmeg Street to Murrieta Oaks Road	82,900	73.4	2,580	816	258
Murrieta Oaks Road to I-215	79,000	73.3	2,455	776	246
I-215 to Antelope Road	70,200	70.2	1,211	383	121
Antelope Road to Meadowlark Lane/Whitewood Road	60,700	69.5	1,046	331	105
Calle del Oso Oro					
Clinton Keith Road to Calle Cipres	10,200	63.2	239	76	24
Calle Cipres to Washington Avenue	19,800	66.1	464	147	46
Nutmeg Street					
Washington Avenue to Adams Avenue	12,800	64.3	300	95	30
Adams Street to Jefferson Avenue	13,200	64.3	309	98	31
Jefferson Avenue to Jackson Avenue	14,200	64.6	333	105	33
Jackson Avenue to Clinton Keith Road	15,200	66.1	473	149	47
Lemon Street					
Washington Avenue to Adams Avenue	6,300	61.5	148	47	15
Adams Avenue to Jefferson Avenue	12,100	64.3	284	90	28
Kalmia Street					
Hayes Avenue to Washington Avenue	8,200	62.6	192	61	19
Washington Avenue to Adams Avenue	18,800	67.2	585	185	59
Adams Avenue to Jefferson Avenue	28,400	69.0	883	279	88
Jefferson Avenue to Madison Avenue	49,300	71.2	1,532	485	153
Madison Avenue to I-15	54,500	71.6	1,696	536	170

Table 11-7 [continued]
General Plan 2035 Roadway Noise Levels

Roadway Segment	Future 2035				
	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)		
			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour
California Oaks Road					
I-15 to Monroe Avenue	54,500	71.5	1,693	535	169
Monroe Avenue to Jackson Avenue	52,400	71.2	1,629	515	163
Jackson Avenue to Hancock Avenue	31,700	68.0	743	235	74
Hancock Avenue to Clinton Keith Road	25,800	68.4	801	253	80
Ivy Street					
Hayes Street to Washington Avenue	700	47.6	6	2	1
Washington Avenue to Adams Avenue	8,900	63.9	277	88	28
Adams Avenue to Jefferson Avenue	14,100	65.9	438	139	44
Jefferson Avenue to Madison Avenue	22,600	67.8	703	222	70
Los Alamos Road					
Madison Avenue to Lincoln Avenue	24,700	68.2	767	243	77
Lincoln Avenue to Hancock Avenue	35,100	69.7	1,092	345	109
Hancock Avenue to I-215	53,600	71.5	1,668	528	167
I-215 to Whitewood Road	31,000	67.9	726	230	73
Whitewood Road to Ruth Ellen Way	3,800	59.3	89	28	9
Murrieta Hot Springs Road					
Jefferson Avenue to Madison Avenue	46,400	71.1	1,441	456	144
Madison Avenue to I-15	77,500	72.8	2,411	762	241
I-15 to I-215	91,000	73.4	2,830	895	283
I-215 to Alta Murrieta Drive	93,000	73.9	2,894	915	289
Alta Murrieta Drive to Jackson Avenue	63,200	72.2	1,966	622	197
Jackson Avenue to Whitewood Road	57,600	71.8	1,792	567	179
Whitewood Road to Margarita Road	66,400	72.4	2,064	653	206
Margarita Road to Eastern City Limits	52,500	71.4	1,633	516	163
Guava Street					
West of Hayes Avenue	5,900	59.9	102	32	10
Hayes Avenue to Douglas Avenue	6,300	60.1	109	34	11
Douglas Avenue to Washington Avenue	5,200	59.3	90	28	9
Adams Avenue to Jefferson Avenue	11,400	62.7	197	62	20
Jefferson Avenue to Madison Avenue	1,100	52.6	19	6	2
Madison Avenue to Monroe Avenue	3,300	57.3	57	18	6
Elm Street					
Adams Avenue to Madison Avenue	2,800	56.4	48	15	5

Table 11-7 [continued]
General Plan 2035 Roadway Noise Levels

Roadway Segment	Future 2035				
	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)		
			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour
Hayes Avenue					
Nighthawk Way to Vineyard Parkway	3,600	57.6	62	20	6
Kalmia Street to Ivy Street	6,500	61.6	152	48	15
Ivy Street to Hawthorne Street	4,900	56.0	42	13	4
Hawthorne Street to Guava Street	4,500	58.6	78	25	8
Washington Avenue					
North of Calle del Oso Oro	10,000	63.2	234	74	23
Calle del Oso Oro to Nighthawk Way/Magnolia Street	14,900	65.0	349	110	35
Nighthawk Way/Magnolia Street to Vineyard Parkway	12,600	64.2	295	93	30
Vineyard Parkway to Kalmia Street	20,800	66.2	488	154	49
Kalmia Street to Ivy Street	8,300	58.3	71	23	7
Ivy Street to Hawthorne Street	1,400	53.6	24	8	2
South of Hawthorne Street	3,300	57.4	57	18	6
Jefferson Avenue					
North of Nutmeg Street	24,500	68.5	762	241	76
Nutmeg Street to Magnolia Street	39,700	69.2	931	294	93
Magnolia Street to Lemon Street	40,100	70.6	1,247	394	125
Lemon Street to Kalmia Street	46,900	71.2	1,458	461	146
Kalmia Street to Ivy Street	61,500	72.2	1,912	605	191
Ivy Street to Murrieta Hot Springs Road	53,600	71.6	1,668	527	167
Murrieta Hot Springs Road to Guava Street	53,100	71.6	1,650	522	165
Guava Street to Fig Street	45,100	72.0	1,822	576	182
Fig Street to Elm Street	44,600	71.9	1,798	569	180
South of Elm Street	30,300	69.1	942	298	94
Madison Avenue					
Kalmia Street to Ivy Street/Los Alamos Road	16,900	67.7	682	216	68
Ivy Street/Los Alamos Road to Murrieta Hot Springs Road	24,100	68.1	749	237	75
Murrieta Hot Springs Road to Guava Street	18,000	61.7	155	49	15
Jackson Avenue					
North of Nutmeg Street	9,600	63.0	225	71	23
Nutmeg Street to Monroe Avenue	18,000	65.7	422	133	42
Monroe Avenue to California Oaks Road	17,600	65.5	412	130	41

Table 11-7 [continued]
General Plan 2035 Roadway Noise Levels

Roadway Segment	Future 2035				
	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)		
			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour
Hancock Avenue					
California Oaks Road to Las Brisas Road	15,300	64.9	358	113	36
Las Brisas Road to Los Alamos Road	24,600	67.0	576	182	58
Los Alamos Road to Murrieta Hot Springs Road	27,000	67.4	633	200	63
I-15					
City Boundary to Nutmeg Street	199,900	81.0	19,309	6,106	1,931
Nutmeg Street to Kalmia Street	199,900	81.0	19,309	6,106	1,931
Kalmia Street Los Alamos Road	197,000	91.0	19,045	6,022	1,904
Los Alamos Road to I-215	142,600	79.6	13,797	4,363	1,380
I-215 to Cherry Street	248,800	82.1	24,066	7,610	2,407
I-215					
Scott Road to Los Alamos Road	195,300	80.7	15,512	4,905	1,551
Los Alamos Road to Murrieta Hot Springs Road	170,600	81.1	16,506	5,220	1,651
Murrieta Hot Springs Road to I-15	149,900	80.5	14,501	4,586	1,450

ADT = average daily trips; dBA = A-weighted decibels; CNEL = community noise equivalent level

Source: Traffic noise modeling is based on traffic data provided by Iteris, January 2011.

Of the roadway segments modeled, 25 segments (along Clinton Keith Road, Calle del Oso Oro, Nutmeg Street, Kalmia Street, California Oaks Road, Ivy Street, Los Alamos Road, Elm Street, Washington Avenue, Jefferson Avenue, Madison Avenue, Jackson Avenue, and Hancock Avenue) would generate noise levels between 65 dBA CNEL and 70 dBA CNEL at 100 feet from the centerline.

Sixteen modeled roadway segments (along Calle del Oso Oro, Nutmeg Street, Lemon Street, Kalmia Street, Ivy Street, Elm Street, Hayes Avenue, and Washington Avenue) would generate noise levels between 60 dBA CNEL and 65 dBA CNEL at 100 feet from the centerline.

Thirteen modeled roadway segments (along Ivy Street, Los Alamos Road, Guava Street, Hayes Avenue, and Washington Avenue) would generate noise levels below 60 dBA CNEL at 100 feet from the centerline.

Rail Noise

Opportunities to pursue light rail transit and high speed rail are planned for the future of the City, which would create a new source of mobile noise. At this time, the location of any potential stations or rail alignments is not known. The City would be proactive in coordinating with appropriate agencies in the siting, design, and construction of rail stations and track alignments to ensure that noise attenuation measures are addressed.

CALIFORNIA HIGH-SPEED TRAIN PROGRAM

The California High-Speed Rail Authority is currently in the process of analyzing the potential for a high-speed train (HST) connecting northern and southern California, as discussed in the Circulation Element. The HST has similar noise and vibration characteristics to conventional trains with unique features resulting from the higher speed of travel. The HST is expected to be a steel-wheel, steel-rail electrically-powered train operating on its own tracks in an exclusive right-of-way. Due to no highway grade crossings, the train horn and warning bells would be eliminated except in the case of emergencies. The use of electrical power cars eliminates the rumble associated with diesel-powered locomotives. All of these factors allow HST to generate lower noise levels than conventional trains at speeds with which most people are familiar. However, at higher speeds, HST shows a noise increase over conventional trains due to aerodynamic effects. A mitigating factor is that the high speeds enable HST noise to occur for a relatively short duration (a few seconds at the highest speeds).

Vibration of the ground caused by the pass-by of the HST is similar to that caused by conventional steel wheel/steel rail trains. The same speed-dependent vibration generation mechanisms are present in each type of train. Holding down vibration levels associated with the HST are the new track construction and smooth track and wheel surfaces resulting from high maintenance standards required for high speed operation.

Airport Noise

Off-road transportation noise is also generated by aircraft traffic from one nearby airport, the French Valley (Rancho California) Airport, located outside of the City's Sphere of Influence. The CLUP indicates that the 55 CNEL noise level contour extends slightly into the eastern part of the City along the westerly side of Winchester Road. The CLUP also designates portions of the City as being located within Compatibility Zones B1, C, D, and E, all of which require certain land use restrictions. The City will continue to work with the Riverside County Airport Land Use Commission in the development of the French Valley Airport Land Use Plan and other planning and environmental studies.

STATIONARY SOURCES

Commercial and industrial land uses are located near sensitive receptor areas. These uses currently generate occasional stationary noise impacts. Primary noise sources associated with these facilities are due to customer trips, delivery trucks, heavy machinery, air compressors, generators, outdoor loudspeakers, and gas vents. Other significant stationary noise sources within the City include construction activities, street sweepers, and gas-powered leaf blowers.

Residential Uses

Residential uses will comprise the largest land use category in Murrieta. Future development of residential lots would create stationary noise typical of any new residential development. Noise that is typical of single-family residential areas includes children playing, pets, amplified music, pool and spa equipment operation, mechanical equipment, woodworking, car repair, and home repair. Noise from residential stationary sources would primarily occur during the "daytime" activity hours.

Commercial/Industrial Uses

Noise generally produced in commercial and industrial districts includes that typically associated with slow moving truck deliveries, parking areas, landscape maintenance, and similar activities. Commercial land uses are generally located along major corridors, including the I-15 and I-215 Freeways, and segments of Jefferson Avenue, Madison Avenue, California Oaks Road, Murrieta Hot Springs Road, and Clinton Keith Road. Industrial land uses are dispersed throughout the City. Noise strategies and actions require the reduction of noise transmission between commercial/industrial and residential uses. Proper site planning and design would ensure the reduction of noise transmission between these uses. Additionally, any future development of mixed uses would be designed to limit noise from loading areas, refuse collection, and other noise generating activities associated with commercial activity.

NOISE CONTROL TECHNIQUES

There are several basic techniques available to minimize the adverse effects of noise on sensitive noise receivers. Acoustical engineering principles suggest controlling the noise source whenever feasible and protecting the noise receptors when noise source control mechanisms have been pre-empted by State and Federal governments.

Noise producers within local jurisdictions include industrial processes, electrical substations, wastewater treatment facilities, transportation system locations, swimming pool/spa pump motors, air conditioning units, drive-through speakers, siren usage, and local government controlled or sanctioned activities (City vehicles, public works projects). Regulatory mechanisms available to control these noise sources include: City *Noise Ordinance*, the application of "conditions of approval" on new developments, land use policy and approval practices as outlined in the General Plan, and noise information in permit applications for sources of stationary noise. In the event that source control mechanisms have been employed and noise impacts persist or are projected to occur, additional techniques should be considered. The following is a partial listing of noise control techniques:

- **Site Planning.** Involves the careful arrangement of land uses, lots, and buildings to minimize intrusive noise levels. The placement of noise compatible land uses between the roadway and more sensitive uses is an effective planning technique. The use of buildings as noise barriers, and their orientation away from the source of noise, can shield sensitive activities, entrances, and common open space areas. Clustered and master planned developments can maximize the amount of open space available for landscaped buffers next to heavily traveled roadways and thereby allow aesthetic residential lot setbacks in place of continuous noise barriers.

- **Architectural Design.** Involves the incorporation of noise reduction strategies in the design and layout of individual structures. Building heights, room arrangements, window size and placement, balcony and courtyard design, and the provision of air conditioning all play an important role in shielding noise sensitive activities from intrusive sound levels.

- **Construction.** Involves the treatment of various parts of a building to reduce interior noise levels. Acoustic wall design, doors, ceilings and floors, as well as dense building materials, the use of acoustic windows (i.e., double glazed, double paned, thick, non-opening, or small with air-tight seals), and the inclusion of maximum air spaces in attics and walls are all available options.

- **Noise Barriers.** Ideally, noise barriers incorporate the placement of berms, walls, or a combination of the two in conjunction with appropriate landscaping to create an aesthetically pleasing environment. Where space is available (e.g., in clustered developments), a meandering earth berm is both effective and aesthetically pleasing. Where space is restricted, a wall is an effective treatment.

City Noise Ordinance

Implementation and enforcement of the City's *Noise Ordinance* will continue to be the primary means of regulating and controlling construction and operational noise. The City may require acoustical studies be prepared as part of the development review process to ensure adequate analysis of potential noise impacts associated with a development project. Additionally, the City will continue to coordinate with airport operators to minimize noise impacts associated with this use.

11.6 GOALS AND POLICIES

GOAL N-1	**Noise sensitive land uses are properly and effectively protected from excessive noise generators.**

POLICIES

N-1.1 Comply with the Land Use Compatibility for Community Noise Environments.

N-1.2 Protect schools, hospitals, libraries, churches, convalescent homes, and other noise sensitive uses from excessive noise levels by incorporating site planning and project design techniques to minimize noise impacts. The use of noise barriers shall be considered after all practical design-related noise measures have been integrated into the project. In cases where sound walls are necessary, they should help create an attractive setting with features such as setbacks, changes in alignment, detail and texture, murals, pedestrian access (if appropriate), and landscaping.

N-1.3 Discourage new residential development where the ambient noise level exceeds the noise level standards set forth in the Noise and Land Use Compatibility Guidelines and the City Noise Ordinance.

N-1.4 Coordinate with the County of Riverside and adjacent jurisdictions to minimize noise conflicts between land uses along the City's boundaries.

GOAL N-2 **A comprehensive and effective land use planning and development review process that ensures noise impacts are adequately addressed.**

POLICIES

N-2.1 Review and update the Noise Ordinance to ensure that noise exposure information and specific policies and regulations are current.

N-2.2 Integrate noise considerations into land use planning decisions to prevent new noise/land use conflicts.

N-2.3 Consider the compatibility of proposed land uses with the noise environment when preparing, revising, or reviewing development proposals.

N-2.4 Encourage proper site planning and architecture to reduce noise impacts.

N-2.5 Permit only those new development or redevelopment projects that have incorporated mitigation measures, so that standards contained in the Noise Element and Noise Ordinance are met.

N-2.6 Incorporate noise reduction features for items such as, but not limited to, parking and loading areas, ingress/egress point, HVAC units, and refuse collection areas, during site planning to mitigate anticipated noise impacts on affected noise sensitive land uses.

N-2.7 Require that new mixed-use developments be designed to limit potential noise from loading areas, refuse collection, and other noise generating activities typically associated with commercial activity through strategic placement of these sources to minimize noise levels on-site.

N-2.8 Encourage commercial uses in mixed-use developments that are not noise intensive.

N-2.9 Orient residential units within mixed-use developments, where possible, away from major noise sources.

N-2.10 Locate balconies and operable windows of residential units within mixed-use developments away from the primary street and other major noise sources, where possible, or provide appropriate mitigation.

GOAL N-3 Noise from mobile noise sources is minimized.

POLICIES

N-3.1 Consider noise mitigation measures in the design of all future streets and highways and when improvements occur along existing freeway and highway segments.

N-3.2 Work with Caltrans to achieve maximum noise abatement in the design of new highway projects or with improvements to interchanges along the I-15 and I-215 Freeways, and with widening of SR-79.

N-3.3 Encourage the construction of noise barriers and maintenance of existing noise barriers for sensitive receptors located along the I-15 and I-215 Freeways.

N-3.4 Enforce the use of truck routes to limit unnecessary truck traffic in residential and commercial areas. Consider requiring traffic plans for construction projects and new commercial and industrial uses.

N-3.5 Consider the use of rubberized asphalt for new roadways or roadway rehabilitation projects.

N-3.6 Coordinate with appropriate agencies in the siting, design, and construction of rail stations and track alignments to ensure that adjacent land uses are considered and noise attenuation measures are addressed.

GOAL N-4 Reduced noise levels from construction activities.

POLICIES

N-4.1 Regulate construction activities to ensure construction noise complies with the City's Noise Ordinance.

N-4.2 Limit the hours of construction activity in residential areas to reduce intrusive noise in early morning and evening hours and on Sundays and holidays.

N-4.3 Employ construction noise reduction methods to the maximum extent feasible. These measures may include, but not limited to, shutting off idling equipment, installing temporary acoustic barriers around stationary construction noise sources, maximizing the distance between construction equipment staging areas and occupied sensitive receptor areas, and use of electric air compressors and similar power tools, rather than diesel equipment.

N-4.4 Encourage the City to purchase and use municipal vehicles or noise-generating mechanical equipment that complies with noise standards specified in the City's Municipal Code, or other applicable codes.

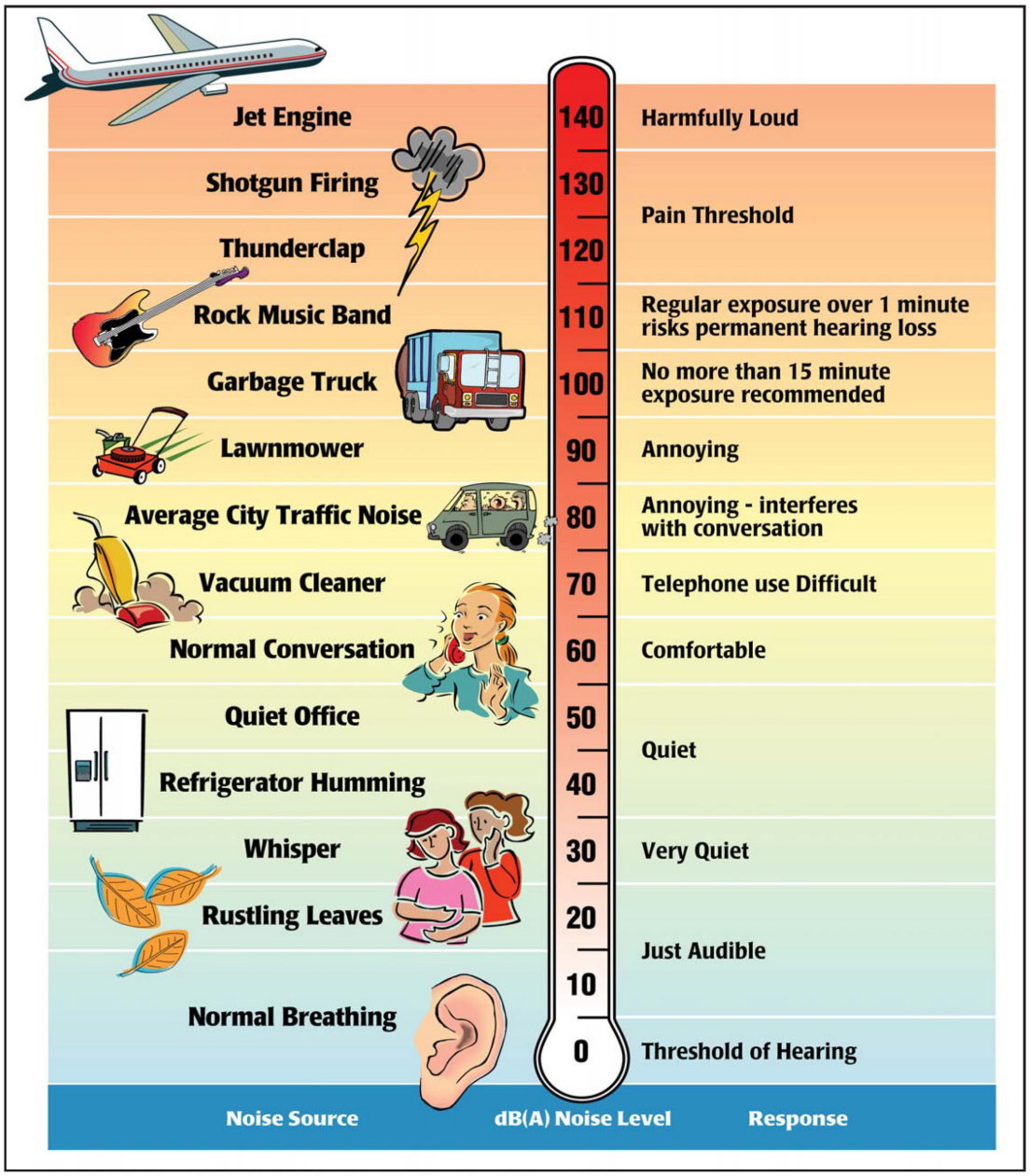
N-4.5 Allow exceedance of noise standards on a case-by-case basis for special circumstances including emergency situations, special events, and expedited development projects.

N-4.6 Ensure acceptable noise levels are maintained near schools, hospitals, convalescent homes, churches, and other noise-sensitive areas.

11.7 IMPLEMENTATION OF THE ELEMENT

Noise is generated by a variety of sources throughout the City. Protecting public health is a priority for Murrieta. The goals and policies of the Noise Element will be implemented by several City departments including, but not limited to, Community Development, Building, and Code Enforcement. Individual development projects and activities will be reviewed to determine whether the proposed use will have an impact on existing and proposed uses within the vicinity. Project review will include the analysis of land use patterns, compliance with Noise Ordinance requirements, and may include project-specific noise studies. Code enforcement activities include responding to and /investigating noise complaints, and noise monitoring. Through coordinated efforts of all City departments, Murrieta will maintain acceptable noise levels for all residents and businesses.

Exhibit 11-1, Sound Levels and Human Response



Source: Melville C. Branch and R. Dale Beland, *Outdoor Noise in the Metropolitan Environment*, 1970.
Environmental Protection Agency, *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* (EPA/ONAC 550/9-74-004), March 1974.

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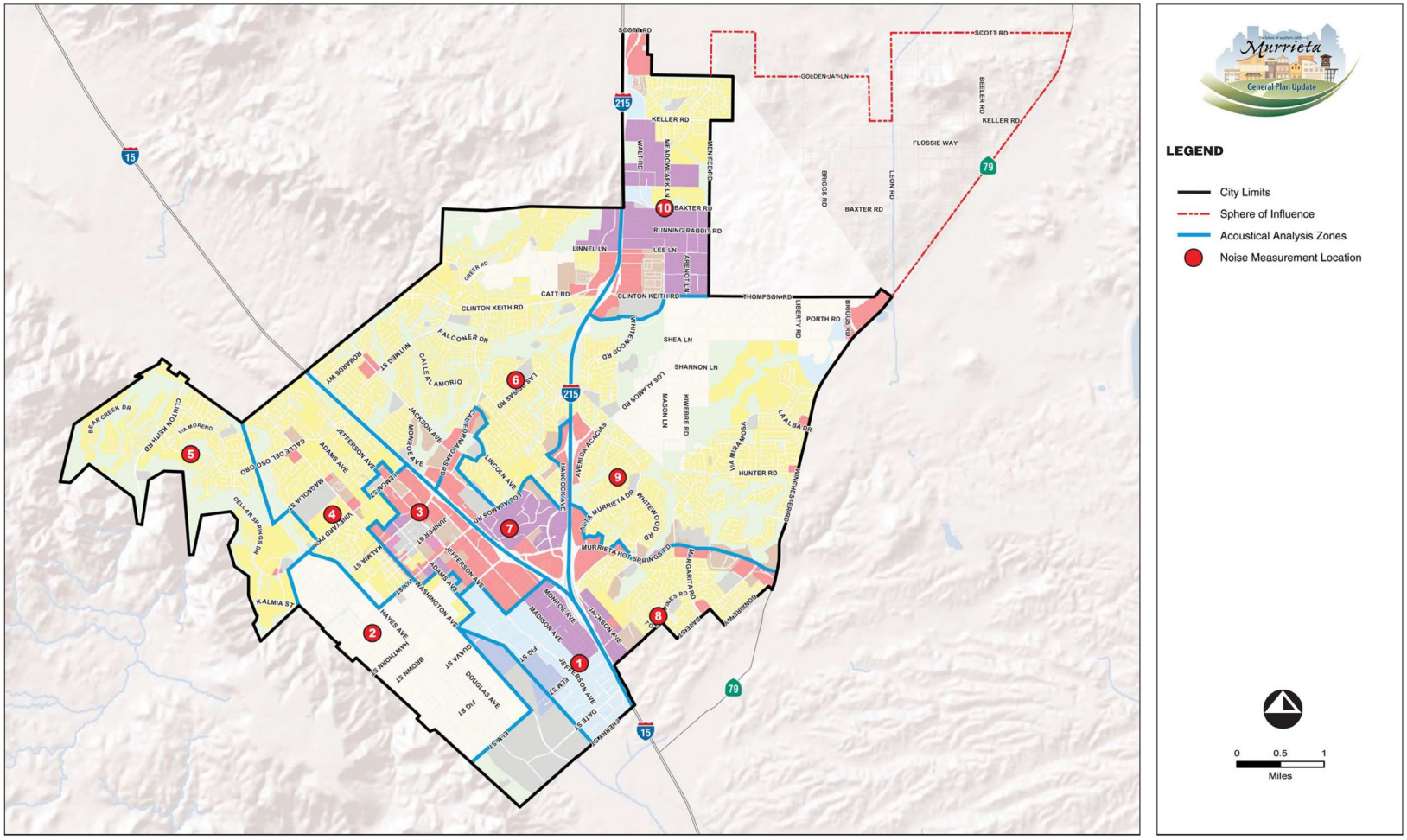
Sound Levels and Human Response

Exhibit 11-1

Exhibit 11-2, Noise Measurement Locations

Exhibit 11-2, Noise Measurement Locations



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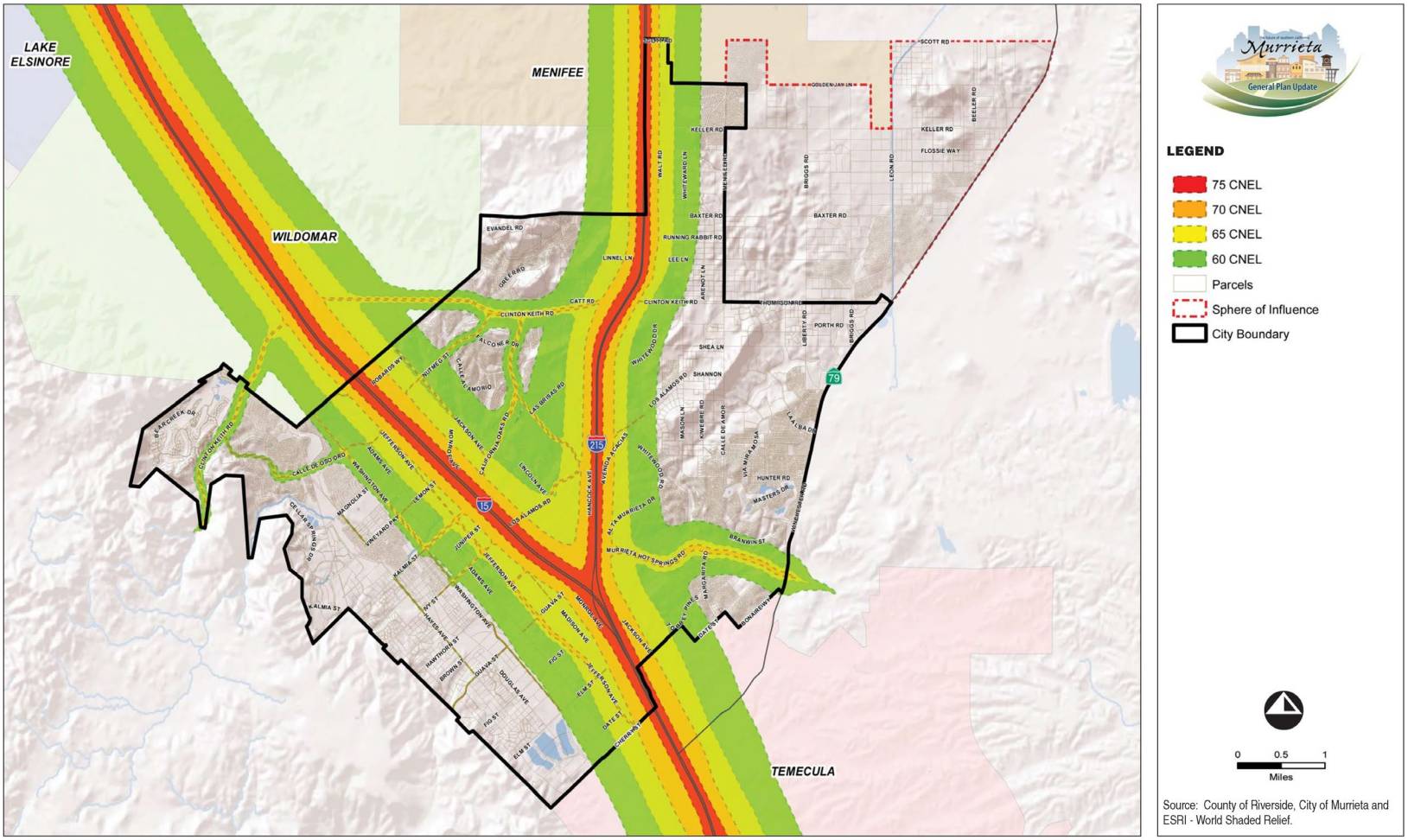
Noise Measurement Locations

Exhibit 11-2

Exhibit 11-3, Existing Roadway Noise Contours



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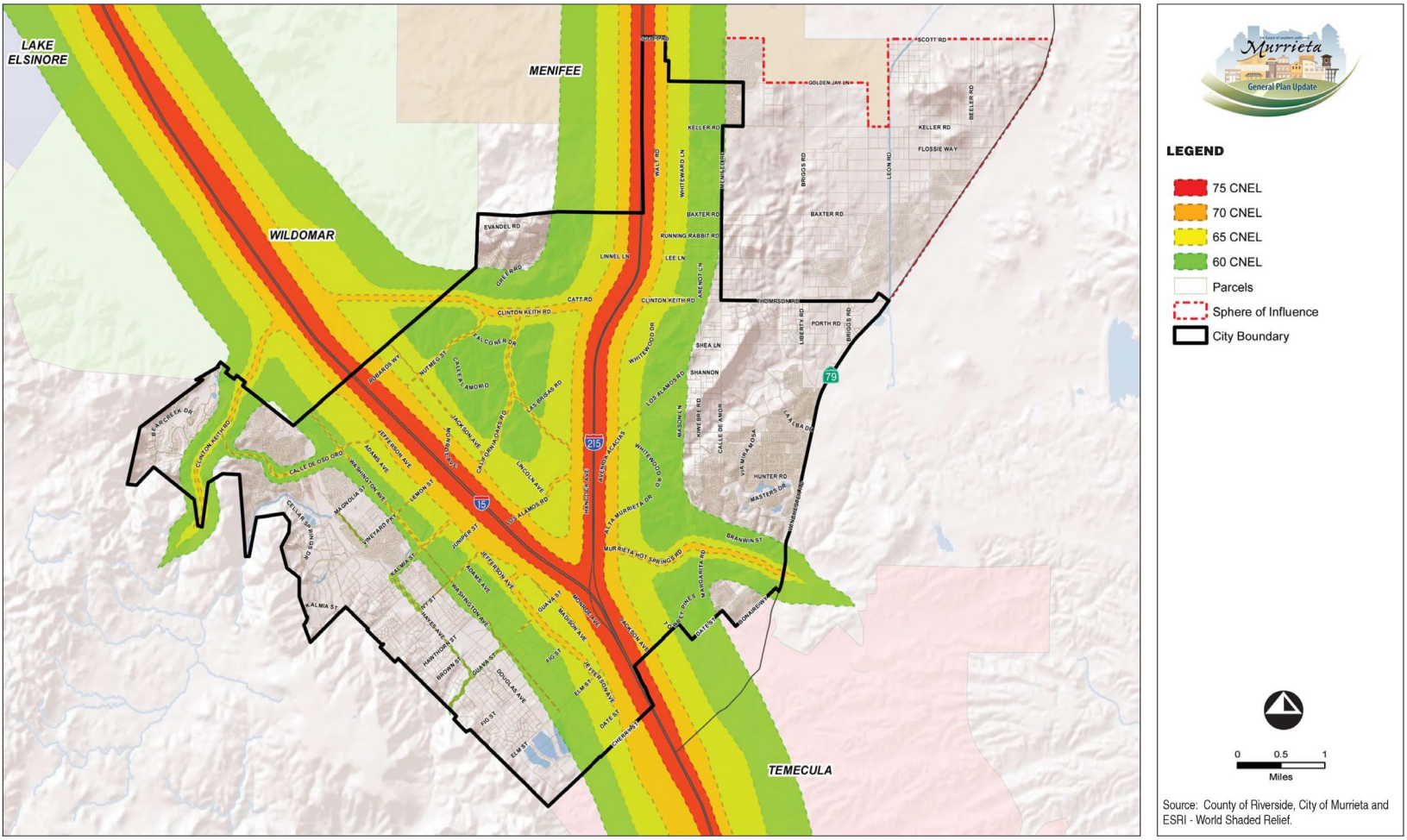
Existing Roadway Noise Contours

Exhibit 11-3

Exhibit 11-4, General Plan 2035 Noise Contours



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General Plan 2035 Noise Contours

Exhibit 11-4

Chapter 12
Safety Element

12.1 INTRODUCTION

The Safety Element describes hazards that exist in Murrieta and the measures that the City is taking to address them. Some naturally occurring hazards may be unavoidable, but their impacts on communities can be reduced through planning and preparation. Thus, the Safety Element addresses geologic, seismic, flood, and fire hazards. This Element also addresses hazards created by human activity: hazardous materials and waste, aircraft hazards, and incidents that call for police protection. Expecting that emergencies will occur even when precautions are taken against hazards, the Safety Element describes the City's efforts to prepare for and respond to emergencies.

This Element supports the following Community Priorities:

- Protect and foster a strong sense of community and safety, as well as the "home town" feeling.
- Improve health care within the City, and continue to provide excellent school, police, fire, library, and recreation services.

12.2 AUTHORITY FOR ELEMENT

California *Government Code* Section 65302(g) requires that a General Plan include:

> *"…A safety element for the protection of the community from any unreasonable risks associated with the effects of seismically induced surface rupture, ground shaking, ground failure, tsunami, seiche, and dam failure; slope instability leading to mudslides and landslides; subsidence, liquefaction, and other seismic hazards identified pursuant to Chapter 7.8 (commencing with §2690) of Division 2 of the Public Resources Code, and other geologic hazards known to the legislative body; flooding; and wildland and urban fires…"*

DRAFT

12.3 SETTING THE CONTEXT: KEY ISSUES AND CHALLENGES

GEOLOGIC HAZARDS

Geological Setting

The City and Sphere of Influence are located within the northern portion of the Peninsular Range geomorphic province, which is characterized by steep, elongated valleys and ranges that generally trend northwestward from the tip of Baja California to the Los Angeles Basin. Features around Murrieta include the Santa Ana Mountains and the Santa Rosa Plateau directly to the west, the Santa Margarita and Agua Tibia ranges approximately 12 to 14 miles to the south, and the San Jacinto ranges approximately 35 miles to the east.

Murrieta is situated within two structural blocks or subdivisions of the Peninsular Range province that are separated by the active Elsinore fault zone, which forms a complex pull-apart basin known as the Temecula Valley that is filled with sedimentary deposits. Major deposits and bedrock formations are shown in *Exhibit 12-1*, *Regional Geology Map*.

Soils

Expansive soils and collapsible soils present potential hazards in Murrieta. Expansive soils are surface deposits rich in clays that expand when wet and shrink when dried. The change in volume can exert detrimental stresses on buildings and cause structural damage. The collapsible soils process, or hydro-consolidation, typically occurs in soils deposited less than 10,000 years ago that contain a high percentage of voids and possess low relative density. Damage to structures and ground cracking due to collapse of recent alluvial deposits occurred in the California Oaks area of Murrieta when ground water levels rose due to a rise in groundwater or irrigation.

Loading Settlement

Loading settlement can be immediate or occur gradually over a long period of time. Immediate settlement is normally associated with loose granular soils when they are subjected to loads. These soils are generally found in young alluvium or loosely deposited materials.

Subsidence

Subsidence is the ground settlement that results over time from the extraction of oil or groundwater. This process usually extends over a large area and occurs on a gradual basis so the settlement effects on a single site, relative to its immediate neighbors, may be negligible as the neighboring properties are also subsiding.

Although there are no reports of significant subsidence due to groundwater withdrawal in the City, alluvial valley areas are considered susceptible; refer to *Exhibit 12-2*, *Subsidence Susceptibility Map*.

Radon Gas

According to the California Department of Public Health Services website, rocks containing the minerals that release radon gas exist in the Murrieta area. Radon gas is a naturally occurring radioactive gas that is tasteless, odorless, and invisible. It becomes hazardous when confined in buildings and the long term exposure levels in the air exceed the United States Environmental Protection Agency's concentration of 4 picocuries per liter (4pCi/L).

SEISMIC HAZARDS

The City of Murrieta, like the rest of southern California, is located within a seismically active region. Faults and earthquakes present direct hazards from fault rupture and ground shaking as well as indirect hazards, described below.

Faults

The most significant known active fault zones that are capable of seismic ground shaking and can impact Murrieta are the Elsinore Fault Zone, San Jacinto Fault Zone, Newport-Inglewood Fault Zone, and the San Andreas Fault Zone.

- **Elsinore Fault Zone.** The Elsinore Fault Zone, which includes the local Elsinore-Temecula fault, passes through Murrieta to the west of Interstate I-15; refer to *Exhibit 12-3*, *Alquist-Priolo Earthquake Fault Zone Map*, and *Exhibit 12-4*, *Riverside County Fault Hazard Map*. The Elsinore-Temecula Fault Zone is capable of generating a Maximum Earthquake Magnitude (Mw) of 6.8 per the Richter scale.

- **San Jacinto Fault Zone.** The San Jacinto Fault Zone is located at it's nearest point to the city approximately 21 miles northeast of the City and is capable of generating earthquakes in excess of 7.2 Mw.

- **Newport-Inglewood Fault Zone (Offshore).** The Newport-Inglewood Fault Zone is located at it's nearest point to the city approximately 28 miles southwest of the City and is capable of generating earthquakes in excess of 6.9 Mw.

- **San Andreas Fault Zone (Southern Section).** The San Andreas Fault Zone is located approximately 38 miles northeast of the City and is considered the dominant active fault in California. This fault zone is capable of generating earthquakes in excess of 7.4 Mw.

FAULT RUPTURE

To assist cities and counties in avoiding the hazard of surface fault rupture, the Alquist-Priolo Earthquake Fault Zoning Act requires the State Geologist to establish Earthquake Fault Zones around the surface traces of active faults. The State has identified two Alquist-Priolo

Earthquake Fault Zones within Murrieta, shown in *Exhibit 12-3*. The Temecula Segment of the Elsinore Fault Zone traverses the City, and the Murrieta Creek Fault is located at the extreme southwest corner of the City.

Before a project can be permitted within a fault zone, a site-specific geologic investigation must demonstrate that proposed buildings will not be constructed across an Alquist-Priolo Earthquake Fault Zone, County Fault Zone, or any other active or potentially active fault. Structures are required to be set back from active faults. The earthquake fault zones extend approximately 500 feet in width on either side of a major active fault trace and approximately 200 to 300 feet in width on either side of a well defined minor active fault, as designated by the State. Development of a building designated for human occupancy is generally restricted within 50 feet of an identified fault.

In addition, the Natural Hazards Disclosure Act requires that sellers of real property and their agents provide prospective buyers with a “Natural Hazard Disclosure Statement” when the property that is being sold l ies within an Earthquake Fault Zone.

SEISMIC SHAKING

The effect of seismic shaking on future structures and land development projects within the City may be mitigated by adhering to adopted building codes. The *California Building Standards Code* regulates the design and construction of foundations, building frames, retaining walls, excavations, and other building elements to mitigate the effects of seismic shaking and adverse soil conditions.

Secondary Seismic Hazards

Ground shaking can induce secondary seismic hazards such as liquefaction, lateral spreading, subsidence, ground fissuring, and landslides. Liquefaction of saturated cohesionless soils can be caused by strong ground motion resulting from earthquakes. A majority of the alluvial deposits along the Murrieta Creek lie within a liquefaction hazard zone per the County of Riverside; refer to *Exhibit 12-5*, *Liquefaction Susceptibility Map*. The process of liquefaction may also produce lateral spreading of soils on properties adjacent to creeks and drainages, such as Murrieta Creek and Warm Springs Creek.

The active Elsinore-Temecula Fault and the Murrieta Creek Fault may develop fissuring along the fault trace during a significant seismic event or groundwater elevation change, which could lead to differential subsidence. If commercial water wells are installed within or near the subsidence zone, the potential for ground fissuring and differential settlement could be substantially increased.

Earthquake-related landslide potential within the City limits can be understood based on known conditions and published geologic maps. Several old landslides have been mapped in areas along the Santa Ana Mountains eastern slopes and the hills along the northern side of the City. The State Seismic Hazard Zones map provides locations of previous known landsliding or where local conditions indicate a potential for ground displacements.

The potential for rock fall due to a seismic event or natural weathering and instability is present in properties at the base of hillsides where rocks and boulders exist.

FLOOD HAZARDS

Creeks

The City and most of the Sphere of Influence (SOI) lie within the inland portion of the Santa Margarita River Basin. Murrieta Creek and Temecula Creek are the main tributaries of the Santa Margarita River. Murrieta Creek drains approximately 220 square miles of the upper watershed. It runs through the Murrieta Valley and flows southeasterly through the portion of the City that lies between Interstate 15 and the base of the Santa Rosa Plateau. A network of washes and intermittent stream courses occur throughout Murrieta, collecting the seasonal runoff from slopes and valley floors and bringing it towards the creek. Stream flows for Murrieta Creek have been highly variable, and flooding frequently occurs in Historic Murrieta. Warm Springs Creek is a tributary to Murrieta Creek that drains extensive valley and upland areas; it flows southwesterly through the Murrieta Hot Springs area, entering Murrieta Creek in the southern part of the City.

FLOOD HISTORY

The largest known flood in the Santa Margarita Watershed was in January 1862, and the second greatest was in February 1884. Other major floods occurred in years 1916, 1938, 1943, 1969, 1978, 1980, 1991, 1992, 1993, 1995, and 1998. In both January and February 1993, Riverside County was hit by severe storms resulting in a Presidential Disaster Proclamation. These large flood events deposited two to six feet of sediment in the Murrieta Creek streambed from Winchester Road south into Old Town Temecula. Breakouts of floodwaters were caused largely by the magnitude of the event, vegetation density, and the sediment accumulations within the channel that severely reduced flow-carrying capacity. Damage to flood control and other public facilities resulted.

Much of Murrieta Creek and sections along Warm Springs Creek lack formal flood control systems, and as a result drainage is haphazard in the less developed areas of the City, even with moderate rain. This results in frequent overtopping of the Murrieta Creek channel by floodwaters in a number of channel reaches, flood inundation of structures with attendant damages, and other water-related problems caused by these events including emergency costs, traffic disruption, and automobile damage.

The Riverside County Multi-Jurisdictional Local Hazard Mitigation Plan assigned Murrieta a flood severity rating of 3 and a probability rating of 3 on a scale of 0-4, with 4 being the most severe or most likely to occur.

100-YEAR FLOODS

One-hundred-year floods are those that have a 1/100 or one percent chance of occurring in any given year. A total of 1,021.2 acres in the City of Murrieta are within the 100-year flood zone, as shown in *Exhibit 12-6*, *FEMA Flood Zones*.The 100-year flood is a regulatory standard used by

Federal agencies and most states to administer floodplain management programs, and is also used by the National Flood Insurance Program (NFIP) as the basis for insurance requirements nationwide. Flood insurance rates are based on FEMA designations of flood zones. The practice is to avoid or restrict construction within 100-year flood zones, or to engage in flood-proofing techniques such as elevating building pads or constructing walls and levees.

Dam Inundation

Portions of the City of Murrieta are subject to potential flooding in the event of dam failure at Lake Skinner or Diamond Valley Lake. Potential dam inundation zones are shown in *Exhibit 12-7*, *Dam Inundation*. Dam failure is considered an extremely remote possibility as dams are designed to be much stronger than necessary to survive the largest magnitude possible earthquake without affecting the dam structure; however, it must be considered and recognized in the planning process.

Preventive Measures

CITY REGULATIONS

The City of Murrieta's regulations with respect to flood damage prevention are included in *Municipal Code* Chapter 15.56, Flood Damage Prevention Regulations. The purpose of this chapter is to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas.

MASTER DRAINAGE PLAN

The City of Murrieta is located within Flood Control District Zone 7 of the Riverside County Flood Control and Water Conservation District. A Master Drainage Plan prepared for the Murrieta Creek area by the District evaluates drainage needs and proposes an economical drainage plan to provide flood protection for both existing and future development in Murrieta. Improvements proposed for Murrieta Creek consist of the channelization of the creek and its major tributaries, and include several concrete-lined open channels and a small network of underground storm drains. The Plan states that certain flood and drainage facilities are critically needed for an orderly and economical development of the Murrieta Creek area.

MURRIETA CREEK FLOOD CONTROL, ENVIRONMENTAL RESTORATION AND RECREATION PROJECT

Besides causing damage to structures and other problems for Murrieta inhabitants, flooding of Murrieta Creek has degraded habitat in one of the last high quality minimally disturbed riverine environments in southern California. In 1997, the U.S. Army Corps of Engineers initiated studies on Murrieta Creek that resulted in the Congressional authorization in 2000 of a $90 million, multi-faceted project known as the Murrieta Creek Flood Control, Environmental Restoration and Recreation Project. However, limited funding has been appropriated for construction to date. This project has four phases:

- **Phase One.** Channel improvements through the City of Temecula, completed in 2004. This phase included an earthen channel flanked by a habitat corridor and multi-purpose trails.

- **Phase Two.** Channel improvements through the City of Temecula to address the possible collapse of the bridge at Main Street with a major rainfall event.

- **Phase Three.** Construction of a 250-acre detention basin which would attenuate tributary flows to reduce the peak discharge of flood waters downstream, and remove the floodplain designation from Phases One and Two of the Project. Bounded by Warm Springs Creek to the north and Santa Gertrudis Creek to the south, the basin is designed as a natural riverine system with ponds that would improve groundwater recharge, establish approximately 160 acres of new environmental habitat, and create over 50 acres of recreational facilities within the City of Murrieta. The multi-purpose basin is critical to the overall design of the Project. Until it is completed, improvements constructed in Phase One remain at risk of damages from floods.

The Murrieta Creek Flood Control, Environmental Restoration and Recreation Project would address flooding in Historic Murrieta while providing habitat and recreational facilities.

- **Phase Four.** Channel improvements through the City of Murrieta that address risk to the treatment plant adjacent to the creek from moderate storms. A spill of untreated water could contaminate downstream waters including the Santa Margarita River and the Ecological Preserve. This phase provides for the largest expansion of "Waters of the U.S." with the development and establishment of a 150-foot wide riparian habitat corridor. The City of Murrieta continues to be actively engaged in both the design and funding issues related to the Project and has initiated engineering design on both the Guava Street and Ivy Street Bridges.

FIRE HAZARDS

Wildland Fires

A wildland fire is an uncontrolled fire spreading through vegetative fuels that may expose or consume structures. Although not located in a wilderness area, the threat of a wildland fire in or near Murrieta is high due to the wildland urban areas in and around the City, where structures and other human development meet or intermingle with wildland or vegetative fuels. The threat of wildfire is particularly significant during dry summer months and when there are strong Santa Ana winds. The fire season extends approximately five to six months, from late spring through

fall. The aftermath of wildland fire produces new areas of potential landslide as burned and defoliated areas are exposed to winter rains. The undeveloped hillside areas in and adjacent to the City present a potentially serious hazard due to the high potential for large scale wildland fires, as shown in *Exhibit 12-8*, *Very High Fire Hazard Zones*. The escarpments along the western boundary of the City are notorious for their threat of wildland fires that move quickly through the area. Similar wildland areas exist in northern Murrieta, in the Greer Ranch and Los Alamos areas. Within the City, wildland fires are assigned a severity rating of 3 and a probability rating of 2 in the Riverside County Multi-Jurisdictional Local Hazard Mitigation Plan.

A vegetation fire near I-15 on a windy day in October 2009 was contained without damage to structures.

There are a number of building criteria and site maintenance techniques available for Murrieta Fire & Rescue and property owners to use for areas within a Very High Fire Hazard Zone or areas described as Wildland Urban Interface areas, which are areas where structures and other human development meet and intermingle with undeveloped wildland or vegetative fuels. These techniques are detailed in the California Building Standards Code *California Code of Regulations Title 24*, Public Resources Code sections 4290 & 4291, and Government Code sections 51175-51189 and address topics such noncombustible siding for buildings and 100-foot fuel modification (buffer) zones. In addition, community planning, awareness, and involvement are proven elements of effectively reducing the occurrence of wildland fires and damage associated with them.

Urban Fires

No significant unusual urban fire hazards have been identified in Murrieta. Local very high fire hazard zones are located in the wildland/urban interface areas, as described above. Management of hazardous materials that can cause fires is described in the Hazardous Materials Hazards section. Protection from urban fire hazards includes fire prevention and suppression, described in Fire Protection below.

Fire Protection

Murrieta Fire & Rescue is the primary provider of fire suppression and fire prevention services in the City of Murrieta, while the Sphere of Influence is served by the Riverside County Fire Department. However, Murrieta Fire & Rescue participates in an Automatic Aid Agreement with the County Fire Department to expedite service delivery to the eastern portion of the City. Murrieta Fire & Rescue (MFR) may also provide service to the Sphere by means of this Automatic Aid Agreement.

The Murrieta Fire & Rescue is prepared to respond to a variety of emergencies.

MFR participates in the California Master Mutual Aid Agreement. In the event of a major fire, outside resources can be brought into the City as needed.

MFR has five stations located to optimize response times throughout the City of Murrieta, listed in *Table 12-1*, *Murrieta Fire & Rescue Stations*, with a proposed sixth station in the eastern Sphere of Influence area (refer to *Exhibit 12-9*, *Fire Station Service Areas*).

Table 12-1
Murrieta Fire & Rescue Stations

Station	Location
Fire Station No. 1	41825 Juniper Street
Fire Station No. 2	40060 California Oaks Road
Fire Station No. 3	39985 Whitewood Road
Fire Station No. 4	28155 Baxter Road
Fire Station No. 5	38391 Vineyard Parkway
Fire Station No. 6	Specific Location TBD

RESPONSE TIME AND ISO RATING

MFR has a total response time goal within the City of 6:04 minutes for medical emergencies and an effective response force (all resources dispatched to arrive at scene) for fire incidents of 10:24 minutes as measured by the National Fire Protection Association (NFPA) 1710 Standards and the Community Risk Assessment - Standards of Cover. Stations in the outlying regions experience longer average response times, such as the eastern portion of the City along Winchester Road and in the area between Winchester and the I-215 north of Clinton Keith. A sixth fire station in this area is contemplated to help achieve the target response time.

Insurance Services Office (ISO) rates fire department staffing and equipment, communications centers and water systems. The numeral classification rating is utilized to establish the community's residential, commercial and industrial insurance rates. For every decrease in one rating point, these insurance costs may decrease by approximately 10 percent. MFR's ISO rating is 4 in areas with fire hydrants and 9 in outlying areas that do not have water supply.

PROTECTION FOR HIGH-RISE BUILDINGS

As Murrieta develops with more Class A high-rise office buildings, further investments in MFR equipment and personnel are needed. An aerial truck company with a ladder extension of 100 feet or greater will be able to access and provide fire suppression for buildings such as Loma Linda University Medical Center-Murrieta.

FIRE PREVENTION

MFR in activities that are aimed at preventing fires and compliance with California Building Standards Code, Title 24, and the California Fire Code *(California Code of Regulations, Title 24*). MFR provides fire protection engineering, building inspections for code compliance, and hazardous materials inspections. As described later in this Element, MFR also provides education and training in public safety and emergency preparedness.

HAZARDOUS MATERIALS AND WASTE

A hazardous material is any substance that may be explosive, flammable, poisonous, corrosive, radioactive, reactive, or any combination thereof, because of its quantity, concentration, or characteristics. Hazardous materials require special care in handling due to the hazards they pose to public health, safety, and the environment. Potential hazards associated with hazardous materials include fires, explosions, and leaks. Releases of hazardous materials can be damaging when they occur in highly populated areas or along transportation routes.

Hazardous materials are transported through the City, and businesses within the City handle, transport, use, and/or store hazardous materials. Other sources of hazardous materials include agricultural operations, illegal drug manufacturing, and clandestine dumping. Within the City, hazardous materials accidents are assigned a severity rating of 3 and a probability rating of 3 in the Riverside County Multi-Jurisdictional Local Hazard Mitigation Plan.

Existing Federal, State, and local laws regulate the use, transport, disposal, and storage of hazardous materials within the City.

Transport of Hazardous Materials

Hazardous substance incidents are likely to occur within the City of Murrieta due to the presence of highways. Transportation of hazardous materials/wastes is regulated by *California Code of Regulations* Title 26. The Federal Department of Transportation (DOT) is the primary regulatory authority for the interstate transport of hazardous materials, and establishes regulations for safe handling procedures (i.e., packaging, marking, labeling, and routing). The California Highway Patrol and the California Department of Transportation enforce Federal and

State regulations and respond to hazardous materials transportation emergencies. Emergency responses are coordinated as necessary between Federal, State and local governmental authorities and private persons through the Murrieta Emergency Operations Plan.

Hazardous Materials Sites

Certain businesses in the City of Murrieta incorporate hazardous materials into their production or service processes, and some generate hazardous waste. These businesses include automotive services, dry cleaners, photo processing, printing, lithography, and medical services.

Hazardous materials disclosure allows for the inspection of businesses that generate, store, and use hazardous materials. Through regular inspections, MFR can identify hazardous conditions and can obtain compliance through the fire code to provide for the safety of citizens and fire fighters in the event of a hazardous materials fire or release. Riverside County Environmental Health acts as the city's designated branch for the Certified Unified Program Agency (CUPA) by the California Environmental Protection Agency related to hazardous materials.

Monitoring of sites which have contamination associated with underground tanks used to store petroleum products is the primary responsibility of the California Department of Health Services and the Regional Water Quality Control Board. The Existing Conditions report provides information on known leaking underground fuel tank (LUFT) sites in Murrieta.

At least one property in Murrieta is subject to regulation under the Site Mitigation and Brownfields Reuse Program of the California Department of Toxic Substances Control. Further information is provided in the Existing Conditions Background Report.

Hazardous Materials Incidents

MFR responds to hazardous materials incidents, with further assistance provided by the County Fire Department Hazardous Materials Response Team and the County Health Department. All MFR personnel receive first responder operations training and are trained in hazardous materials decontamination procedures, so that they can determine that a problem exists, isolate the problem, and assist an advanced team when it arrives.

Hazardous Waste

Hazardous waste is waste with properties that make it dangerous or potentially harmful to human health or the environment. Through its membership in the Southern California Hazardous Waste Management Authority, the County of Riverside has agreed to work on a regional level to solve problems involving hazardous waste. The County of Riverside does not presently have any hazardous waste management facilities within its jurisdiction and therefore must rely on intergovernmental agreements to fulfill its fair share responsibility. The Riverside County Hazardous Waste Management Plan is the County's primary planning document for the management of hazardous materials and waste.

Riverside County landfills do not accept hazardous waste. However, households may bring hazardous waste to collection centers and collection events, while businesses contract with registered hazardous waste transporters.

AIRCRAFT HAZARDS

The French Valley Airport is a County-owned public-use airport located on SR-79 (Winchester Road) in unincorporated Riverside County east of Murrieta, adjacent to Temecula and Winchester. The airport is primarily used for single engine fixed-wing general aviation aircraft. Airport activity is anticipated to increase from approximately 84,000 annual operations in 2002 to 185,000 in about 20 years.

The Riverside County Airport Land Use Commission (RCALUC) adopts plans to protect and promote the safety and welfare of airport users and residents in the airport vicinity. The *Riverside County Airport Land Use Compatibility Plan* establishes policies applicable to land use compatibility planning in the vicinity of airports throughout Riverside County. Compatibility plans serve as a tool for use by airport land use commissions in fulfilling their duty to review proposed development plans for airports and surrounding land uses. Additionally, compatibility plans set compatibility criteria applicable to local agencies in their preparation or amendment of land use plans and ordinances and to landowners (including special district and other local government entities as well as private parties) in their design of new development. State law requires each local agency having jurisdiction over land uses within an ALUC's planning area to modify its general plan and any affected specific plans to be consistent with the compatibility plan.

As adopted by the RCALUC, the *Riverside County Airport Land Use Compatibility Plan Policy Document* establishes policies applicable to land use compatibility planning in the vicinity of airports throughout Riverside County, including French Valley Airport. Included in the *Policy Document* are Compatibility Criteria and Airport Influence Area maps for each individual airport. The *Compatibility Plan* details the procedural requirements associated with the compatibility review of development proposals. An "Airport Influence Area" is an area in which current or future airport-related noise, overflight, safety, or airspace protection factors may significantly affect land uses or necessitate restrictions on those uses.

The basic function of airport land use compatibility plans is to promote compatibility between airports and the land uses that surround them. Compatibility plans set compatibility criteria applicable to local agencies in their preparation or amendment of land use plans and ordinances and to landowners in their design of new development. The principal compatibility concerns involve impacts related to:

- Exposure to aircraft noise;
- Land use safety with respect both to people on the ground and the occupants of aircraft;
- Protection of airport airspace; and
- General concerns related to aircraft overflights.

The basic criteria for assessing whether a land use plan, ordinance, or development proposal is deemed compatible with a nearby airport are set forth in Table 2A of ALUC's Policy Document,

Basic Compatibility Criteria Matrix.[1] These criteria are used in conjunction with the compatibility map and policies for each airport. The Compatibility Criteria matrix represents a compilation of compatibility criteria associated with each of the four airport impacts identified above. The Compatibility Criteria are presented according to the following Compatibility Zones, which are set forth for the purposes of assessing land use compatibility within the airport influence area:

- **Zone A, *Runway Protection Zone and Within Building Restriction Line*:** Noise impact is very high; and risk level is very high.
- **Zone B1, *Inner Approach/Departure Zone*:** Noise impact is high; risk level is high.
- **Zone B2, *Adjacent to Runway Zone*:** Noise impact is moderate to high; risk level is low to moderate.
- **Zone C, *Extended Approach/Departure Zone*:** Noise impact is moderate; risk level is moderate.
- **Zone D, *Primary Traffic Patterns and Runway Buffer Area Zone*:** Noise impact is moderate; risk level is low.
- **Zone E, *Other Airport Environs Zone*:** Noise impact is low; risk level is low.
- **"*", *Height Review Overlay*:** Noise impact is low; risk level is moderate.

The Compatibility Criteria in Table 2A specify the maximum residential densities and non-residential intensities, required open land, prohibited land uses, and other development conditions (i.e., avigation easement dedication, structure locations, minimum Noise Level Reductions (NLR), airspace review, and deed notice requirement). The Compatibility Criteria are discussed in detail in Chapter 2 of the ALUC's Policy Document, *Compatibility Criteria for Land Use Actions*.

The Compatibility Plan identifies the following prohibited uses within each of the zones:

- Zones B1 and B2 prohibit children's schools, day care centers, libraries, hospitals, nursing homes, places of worship, buildings with more than two above ground habitable floors, highly noise-sensitive outdoor non-residential uses, aboveground bulk storage of hazardous materials, critical community infrastructure facilities, and hazards to flight which can include physical (e.g., tall objects), visual, and electronic forms of interference with the safety of aircraft operations.
- Zone C prohibits children's schools, day care centers, libraries, hospitals, nursing homes, buildings with greater than three aboveground habitable floors, highly noise-sensitive outdoor non-residential uses, and hazards to flight.
- Zone D prohibits highly noise-sensitive outdoor non-residential uses and hazards to flight.

[1] http://www.rcaluc.org/filemanager/plan/new//04-%20Vol.%201%20County%20wide%20Policies.pdf, Accessed June 18, 2010.

- Zone E prohibits hazards to flight.

The Compatibility Plan identifies additional compatibility policies for specific zones that pertain to building heights, residential densities, non-residential intensities, and calculations regarding the concentration of people.

The Compatibility Plan contains land use restrictions for the French Valley Airport that affect land use densities and building heights within the City of Murrieta. As addressed in the Noise Element, aircraft from French Valley Airport do not contribute a significant amount of noise heard in the City. Refer to the Land Use Element for goals and policies related to the French Valley Airport.

POLICE PROTECTION

The Murrieta Police Department provides police protection services within the City of Murrieta. Besides responding to incidents involving safety and law enforcement, the Police Department actively promotes safety through education programs, community partnerships, and providing advice on incorporating Crime Prevention Through Environmental Design principles into development projects.

The Murrieta Police Department seeks to improve safety in partnership with the community.

Crimes and Police Activity

In 2009, The *Los Angeles Times* ranked Murrieta as the second safest city in the nation for cities with populations over 100,000, based on 2008 preliminary FBI statistics that showed a violent crime rate of 8.4 per 10,000 residents.[2]

Table 12-2, *Police Activity (2006 to 2009)*, shows crimes and other events that generated Police Department activity from 2006 through 2009.

[2] City of Murrieta news release, "Murrieta 2nd Safest City in the Nation," July 8, 2009.

Table 12-2
Police Activity (2006 to 2009)

Type of Activity	2009	2008	2007	2006
Total Reports Taken	7,777	8,461	8,273	8,556
Officer Initiated Activities	40,511	40,867	33,365	29,990
Police Responses	43,021	45,272	43,804	41,509
Fire Responses	6,699	6,447	6,666	6,108
Total Activities Processed	**90,231**	**92,586**	**83,835**	**77,607**
Part 1 Crimes				
Homicide	0	1	3	2
Rape	17	12	9	9
Robbery	34	23	46	31
Assault	199	357	393	388
Burglary	427	442	483	560
Larceny	881	898	1195	1184
Auto Theft	156	166	277	225
Arson	4	10	2	4
Total	**1,718**	**1,909**	**2,408**	**2,403**
Traffic Collisions				
Traffic Collision Responses	1,292	1,225	1,371	1,497
Damage Reports	541	477	464	458
Injury Reports	238	216	258	263
Fatal Reports	0	0	1	1
Total Collision Reports	**779**	**693**	**723**	**722**
Citations Issued				
Parkers	943	1,203	1,225	542
Others (including red light camera)	13,018	13,292	11,077	10,750
Total Citations	**13,961**	**14,495**	**12,302**	**11,292**
Arrest				
Misdemeanor Adult Arrests	1,667	2,024	1,540	1,435
Felony Adult Arrest	564	548	639	642
Misdemeanor Juvenile Arrests	169	308	307	266
Felony Juvenile Arrest	138	147	101	120
Total Arrested	**2,538**	**3,027**	**2,587**	**2,463**

Source: City of Murrieta Police Department, "Police Activity Report," December 2007, December 2008, December 2009.

Staffing and Response Times

The Department's goals will be to reach and maintain police officer and civilian support employee staffing levels to effectively and efficiently address public safety needs. Established response times are as shown in *Table 12-3*, *Target Response Times.* The average response times for Priority 1 and Priority 3 calls are longer than the targets while average response time for Priority 2 calls is shorter than the target.

Table 12-3
Target Response Times

Call Type	Target Response Time
Priority 1	6 minutes
Priority 2	15 minutes
Priority 3	35 minutes

Mutual Aid Agreements

The Department has an automatic aid agreement with the Hemet Police Department S.W.A.T. Team and participates in mutual aid agreements with other S.W.A.T. Teams in Riverside County. The Department also follows the State of California Law Enforcement Mutual Aid Plan. Resources shared through these agreements include Murrieta's bloodhound—used for investigations—and the Riverside County Sheriff's helicopter.

Community Education and Participation

A safe, crime-free environment is created by the community as a whole. Thus, the Police Department has several programs to engage community members, including youth, as partners in promoting safety.

YOUTH PROGRAMS

The Police Department has several educational programs for children in 1st grade through 12th grade: 9-1-1 For Kids, D.A.R.E. and Red Ribbon Week, Every-15-Minutes, and Kid Print/Safety Fairs.

The School Resource Officer Program assigns officers full-time to middle and high schools. School Resource Officers interact with students and serve as positive role models, while providing law enforcement for the campuses.

Police Activities League (PAL) coordinates recreational, educational, and athletic activities for disadvantaged or at-risk youth between the ages of 5 and 17. Police officers volunteer their time to attend PAL events with the intention of providing mentorship and to serve as positive role models. PAL activities create an environment where youth and law enforcement are able to communicate with each other in a neutral environment to foster positive attitudes and mutual respect.

The Department has two programs for youth rehabilitation. The Youth Accountability Team assesses the situations and arrests of delinquent youth aged 12 to 17 and implements a program aimed at rehabilitation, including service referrals and visits. The Southwest Valley Youth Court provides an alternative approach to juvenile justice in which juvenile respondents are sentenced by a jury of their peers for infractions and non-violent misdemeanor crimes.

VOLUNTEER PROGRAMS

Community members are involved in many of the Department's programs. For instance, in Home to School Safety Patrols, parents and community members monitor designated locations around schools to ensure the safety of children on their way to and from school. The Special Enforcement Team manages Murrieta's Neighborhood Watch program.

The Department expands its capacity with the Reserve Officer program, as well as with the Volunteer Program in which participants volunteer at least 16 hours per month. Volunteers assist in Neighborhood Watch, youth programs, Crime Free Multi-Housing, parades, citizen patrols, front counter and receptionist responsibilities, school patrols, and special events.

Crime Prevention Through Environmental Design (CPTED)

The built environment can present opportunities for crimes to occur, or discourage crimes. For instance, design can influence the amount of surveillance provided by residents or passersby, and whether there is an easy escape for someone who commits a crime. Design of public spaces and the relationships between buildings and public space are important considerations in Crime Prevention Through Environmental Design (CPTED). CPTED is a set of approaches to the design of the built environment that seek to minimize opportunities for crime.

CRIME FREE MULTI-HOUSING PROGRAM

New multi-family housing developments going through the development review process in Murrieta must participate in the Crime Free Multi-Housing Program. Through this program, the Department provides recommendations for improving the safety of the developments using CPTED strategies. Tenants also sign a lease addendum form, which lists criminal acts that result in immediate termination of the lease. Communication between rental property managers and the Department helps both parties to deal with problem tenants.

EMERGENCY RESPONSE

Emergency Services

EMERGENCY DISPATCH

Emergency 911 services are provided by the Murrieta Police Department as a joint police/fire dispatch center, dispatching Murrieta fire, police, paramedics, and ambulance services. The dispatch center is inter-connected to the AMR Ambulance dispatch and has a goal to inter-connect with neighboring law and fire dispatch centers, the County Operational Area, School District, and utility companies. It is also a goal to inter-connect to fire apparatus via systems that allow for backup forms of communication between the dispatch center, vehicles, and personnel.

MEDICAL SERVICES

Firefighters are cross-trained to provide services for medical emergencies. All MFR personnel are trained to the level of Emergency Medical Technician (EMT) or are trained as Paramedics. MFR's engine companies are equipped for paramedic service.

URBAN SEARCH AND RESCUE (USAR) TASK FORCE

MFR maintains an Urban Search and Rescue (USAR) team of professional firefighters that are certified by the Federal Emergency Management Agency. They serve the larger community as part of California Task Force 6, supervised by the Riverside City Fire Department and composed of representatives from several Inland Empire fire agencies. The USAR team members regularly train with other agencies for rapid deployment to local, regional, and national incidents.

S.W.A.T. TEAM

The purpose of the Special Weapons and Tactics (S.W.A.T.) Team is to perform special tactical missions in response to unusual occurrences or highly dangerous, life threatening police situations where special skills, tactics, training, and/or equipment are required to protect life and property.

Emergency Preparedness

EVACUATION ROUTES

Currently, the City of Murrieta has no defined evacuation routes in this plan. The Western Riverside Council of Governments (WRCOG) as part of Resilient IE, has prepared Transportation Hazards and Evacuation Maps that define evacuation routes in the city. Under WRCOGs regional evacuation routes, Interstate 15 (I-15) and Interstate 215 (I-215) are considered evacuation routes as they traverse the City granting access from many of the main thoroughfares. Various other streets in the city also may serve as evacuation routes, including, but not limited to Clinton Keith Road, Los Alamos Road, California Oaks Road, Nutmeg Street, Murrieta Hot Springs Road, Washington Ave., Guava Street, Jefferson Ave., and Winchester Road.

EMERGENCY INCIDENT INFORMATION

In the event of a major emergency such as fire, hazardous materials spill, police activity or other situation which may directly impact the City of Murrieta or its residents, the City and MFR website pages, Facebook, Instagram and twitter social media accounts will contain updated information on the nature of the incident, potential impacts to traffic circulation, possible evacuations and/or other pertinent information. The City also has an emergency radio station at AM 1640. Residents who wish to be notified of emergency events and disasters in their area can sign up for the Riverside County's Early Warning Notification System, Alert RivCo and part of RivCo Ready.

COMMUNITY EMERGENCY RESPONSE TEAM (CERT)

The Community Emergency Response Team (CERT) is a nationally recognized program designed to train citizens in the skills needed to survive an earthquake or other disaster should emergency services be interrupted for an extended period of time because of the size of the areas affected, lost communications, and impassable roads. CERT training consists of basic understanding of disaster preparation, disaster teamwork, fire suppression, light search and rescue, medial triage and disaster psychology. Murrieta firefighters provide the training to residents and stakeholders.

EMERGENCY PREPAREDNESS INFORMATION

The City's website provides information from MFR to assist community members in preparing for emergencies, such as a list of supplies and a preparedness checklist. As in CERT training, residents are urged to prepare for at least a week of self-sufficiency.

Emergency Operations Plan

The City of Murrieta Emergency Operations Plan (EOP) addresses the planned response to extraordinary emergency situations associated with natural disasters, national security emergencies, and technological incidents affecting the City of Murrieta. The objective of the EOP is to coordinate and incorporate all the facilities and personnel of the City into an efficient organization capable of responding effectively to all disasters and emergencies. It also facilitates multi-agency and multi-jurisdictional coordination, particularly between the City of Murrieta and Riverside County, special districts, and State agencies, in emergency operations.

The EOP describes the operations of the City of Murrieta Emergency Operations Center (EOC), which is the central management entity responsible for directing and coordinating the various City departments and other agencies in their emergency response activities. The EOC centralizes the collection and dissemination of information about the emergency and makes policy-level decisions about response priorities and the allocation of resources. The Police Department has been designated at the primary EOC. As part of the City's Emergency Management Program, the EOC Manager is responsible for ensuring the readiness of the EOC.

Mutual Aid Agreements

Incidents frequently require responses that exceed the resource capabilities of the affected response agencies and jurisdictions. When this occurs, mutual aid is provided by other agencies, local governments, and the State. Mutual aid is voluntary aid and assistance by the provision of facilities and services, including fire, police, medical and health, transportation, communications, utilities, and other assistance.

The California Master Mutual Aid Agreement is designed to ensure that adequate facilities, resources, and other support are provided to jurisdictions whenever their own resources prove to be inadequate to cope with a given situation. The City of Murrieta is part of Mutual Aid Region VI. Inter-agency, multi-agency, and discipline-specific mutual aid system coordination is used by the City of Murrieta and other member jurisdictions of the Riverside County for coordinating mutual aid. MFR is also part of the standard Countywide and Statewide mutual aid systems.

Volunteer and private agencies are part of the City of Murrieta's mutual aid system. The American Red Cross and Salvation Army are significant elements of response to meet the care and shelter needs of disaster victims. Private sector medical/health resources are also an essential part of the medical response. Volunteer and private agencies mobilize volunteers and other resources through their own systems. They may also identify resource needs that are not met within their own systems that would be requested through the mutual aid system.

12.4 SETTING THE VISION: KEY CONCEPTS AND VISION FOR GENERAL PLAN

Community members describe Murrieta as safe, and place importance on keeping it that way. Residents feel that Murrieta is good for families and want it to be a safe, healthy environment for children in the future. Youth also recognize and value the safety and sense of community they feel in Murrieta. This sense of safety in Murrieta comes from the trust between community members, upkeep of the physical environment, and the provision of effective fire and police services.

The City promotes safety through education, engineering, enforcement, evaluation, community design, and planning for hazards. Fire and Police Departments are involved in these preventive activities and respond to emergencies. These Departments also recognize that safety is in the hands of the people who live and work in Murrieta. Through outreach and education, the City can help community members to create a safe environment.

GEOLOGIC AND SEISMIC HAZARDS

Site-specific geologic review is used to evaluate geologic and seismic hazards that may affect a particular development, and identify appropriate corrective measures. The City requires geotechnical engineering reports for any development within areas with known geologic or seismic hazards, for grading permits, for hillside development, and for proposed critical uses such as hospitals and utilities. The City may also designate land as open space where hazards such as fault lines preclude development.

FLOOD HAZARDS

The Murrieta Creek Flood Control, Environmental Restoration and Recreation Project is designed to reduce flooding as well as to provide other benefits including groundwater recharge, improved habitat, wildlife corridors, and recreation. Key entities involved in this project are the U.S. Army Corps of Engineers, Riverside County Flood Control and Water Conservation District, City of Murrieta, and City of Temecula. These partners should make it a priority to secure funding for construction of this project.

The Master Drainage Plan provides another guide to the flood control improvements that are needed in Murrieta. Where possible, natural drainage will be preserved in conjunction with open space. The City will also seek opportunities to construct recreational trails along waterways, balancing demands for recreation with considerations for safety and habitat.

Flood hazards within floodplain and dam inundation areas will continue to be addressed through land use regulations and project review.

FIRE PROTECTION

Development in the eastern part of the City will create additional demand for a sixth fire station to serve this area, where response times are longer than the target time. Providing fire protection for high-rise office buildings will require investment in new equipment as well as staffing for four-person engine companies. In both cases, new development will need to pay its fair share of the costs associated with fire protection.

Between the time of dispatch and arriving on the scene of an emergency, the majority of MFR response time is spent driving. Circulation improvements planned for Murrieta should positively affect MFR response times.

Preventive measures will continue to be an important part of fire protection in Murrieta, including conditions of development and vegetation clearance to deter the spread of wildland/urban interface fires, MFR review of site plans, and community education, engineering, and enforcement.

HAZARDOUS MATERIALS AND WASTE

MFR oversight and inspection of sites handling hazardous materials is the City's primary tool for reducing risks related to these materials.

Given the City's dependence on groundwater, remediation of leaking underground fuel tanks should be taken seriously. Although regional and state authorities are responsible for monitoring these sites, the City should facilitate their efforts when possible.

Household hazardous waste collection events raise community awareness that items such as cleaning products, batteries, and paint should not be disposed of in the trash. The City and its waste services contractor should promote these events to divert household hazardous waste from landfills.

AIRCRAFT HAZARDS

To reduce risk from aircraft in the eastern part of Murrieta, the City will continue to ensure that land use policies are consistent with the French Valley Airport Land Use Compatibility Plan.

POLICE PROTECTION

Demand for Police Department services will continue to grow with the population, while the Department seeks to reach and maintain police officer and civilian support employee staffing levels to effectively and efficiently address the public safety needs of the community. Expansion of the Police Department facility is needed to accommodate additional staff. Target response times for calls is another measure that the City will strive to meet.

Community Design

Police Department input into the design of the built environment can promote a safer community, whether by incorporating Crime Prevention through Environmental Design strategies into housing developments, or designing streets to minimize traffic conflicts that can cause accidents. Coordination between departments should provide opportunities for this kind of input during project review or City project design.

Code Enforcement

Well-kept properties convey the sense of a watchful community that will notice criminal behavior. Code Enforcement is an important strategy for addressing health and safety issues at the property level while maintaining order in the community overall. Residents value the cleanliness of Murrieta and contribute their own time for cleanup efforts such as maintaining the yards of foreclosed properties. This volunteerism should be encouraged and expanded.

In addition to individual property owner commitment to well-kept properties, the City has a comprehensive code enforcement program that helps to protect property owner investment, promote general health and welfare, and enhance the quality of neighborhoods. This program will continue to be an important part of the City's commitment to neighborhood and business safety, preservation, and improvement, and ensuring that Murrieta maintains and enhances its overall community appearance.

Community Participation

Developing partnerships and trust in the community are essential for effective law enforcement. When residents and businesses are engaged as partners, they can provide information about

criminal activity, supplement Police Department resources by volunteering, and promote a safe, law-abiding environment.

Residents become leaders in creating a safer community by participating in programs such as Home to School Safety Patrols, Neighborhood Watch, and Business Group Meetings with Law Enforcement. Property owners are key to the success of the Crime Free Multi-Housing Program, which relies on their vigilance to identify tenants engaging in criminal activity, communicate with the Police Department about problem tenants, and enforce the lease addendum. Reserve Officers and volunteers expand the capacity of the Police Department. Incorporating community participation into Police Department programs requires investments of staff time in outreach, supervision, and volunteer recognition.

Youth

Police Department outreach programs for youth offer education about safe behavior, police presence at schools, mentoring, and rehabilitation. These programs supplement other activities available for youth in Murrieta and are a form of proactive law enforcement, promoting safe behavior and providing positive interaction with police. Mentoring and rehabilitation programs are targeted toward youth who may otherwise stray into anti-social and illegal behavior. The Southwest Valley Youth Court also provides an opportunity for youth volunteers to participate in the legal system. Because Murrieta is a community that prioritizes youth and safety, it will continue to support youth programs.

EMERGENCY RESPONSE

Emergency Services

The emergency dispatch system in Murrieta provides quick access to the range of services provided by the Police and MFR. Cross-training of fire personnel in life-saving medical procedures provides an extra measure of safety for people who are critically injured or ill. Incorporating Emergency Medical Dispatch into the dispatching system would provide emergency medical assistance to 911 callers even before an engine company can arrive, through properly trained dispatchers. MFR is evaluating the feasibility of using this program.

Cross-training of MFR personnel in Urban Search and Rescue, swift water rescue, and hazardous materials decontamination allows Murrieta to respond to incidents involving a number of hazards discussed in this Element.

MFR and Police Department responses to emergencies are discussed further in Fire Protection and Police Protection.

Emergency Preparedness

The Emergency Operations Plan (EOP) is the master document that organizes emergency preparedness and response efforts in Murrieta, and that provides a framework for coordination with other agencies at the regional and state levels. Each department involved in implementation of the EOP has the responsibility to internalize the plan in its own operations, as well as keep the plan up-to-date. Dedicated staff support for maintenance and implementation of the EOP would make this effort more likely to succeed. Staff training at all levels would also promote readiness to implement the plan.

Public awareness and education is a critical part of emergency preparedness addressed in the EOP. An educated public will know how to prevent injury and property damage during and after emergency events, and also know how to find and offer help to their neighbors. Community members should be prepared to be self-sufficient for as long as a week in the event of a major emergency.

The City will work to educate residents and businesses about appropriate actions to safeguard life and property during and after emergencies. The CERT program offered by the Fire Department provides a higher level of emergency preparedness training for more interested residents, while basic emergency preparation information should be disseminated throughout the population. Education aimed at children has the potential to shift the expectations of an entire generation while also raising awareness among parents. The City will continue education about emergency preparedness through such avenues as presentations to residents, instruction in local schools, and the City's website.

12.5 GOALS AND POLICIES

CITYWIDE SAFETY

GOAL SAF-1 **People and properties are provided with protection from natural and man-made hazards.**

POLICIES

SAF-1.1 Encourage that areas be dedicated as open space when necessary and appropriate to protect property, public health, and safety from hazards such as earthquake fault zones or flood plains.

SAF-1.2 Coordinate emergency responses and planning for hazards with agencies at the County, regional, state, and federal levels.

SAF-1.3 Collect and maintain current information on local hazards, and make it available for public use.

SAF-1.4 Review public safety infrastructure and staff resources as new development is planned or proposed in Murrieta and the Sphere of Influence.

SAF-1.5 Promote coordination among City departments to provide for safety in new development and/or annexation areas.

SAF-1.6 Investigate and pursue additional funding mechanisms available to fund City safety services, facilities, and equipment.

SAF-1.7 Prioritize community education as an essential part of creating a safe community.

GEOLOGIC AND SEISMIC HAZARDS

GOAL SAF-2 **Damage from geologic and seismic hazards is minimized by identifying and addressing these hazards during the planning and engineering of built improvements.**

POLICIES

SAF-2.1 Prior to site development, projects located in areas where liquefaction, subsidence, landslide and fissuring are considered hazards shall be required to prepare geologic reports addressing site conditions, potential risk, and mitigation, to the satisfaction of the City Engineer.

SAF-2.2 Require that all new development comply with the Alquist-Priolo Earthquake Fault Zoning Act.

SAF-2.3 Seek to maintain emergency access in the event of an earthquake by engineering roadways to reduce damage to them.

FLOOD HAZARDS

GOAL SAF-3 Damage from flood and inundation hazards is minimized by improving flood control systems and providing adequate safety protections in areas of the City subject to inundation.

POLICIES

SAF-3.1 Cooperate with the Riverside County Flood Control and Water Conservation District to evaluate the effectiveness of existing flood control systems and improve these systems as necessary to meet capacity demands.

SAF-3.2 Actively participate in and strongly promote timely completion of regional drainage plans and improvement projects which affect the City.

SAF-3.3 Identify natural drainage courses and designate drainage easements to allow for their preservation, or for the construction of drainage facilities if needed to protect the health, safety, and welfare of the community.

SAF-3.4 Require new construction within the 100 year floodplain to meet National Flood Insurance Program standards.

SAF-3.5 Develop and maintain floodplain inundation evacuation plans in cooperation with the Riverside County Flood Control and Water Conservation District and MFR.

SAF-3.6 Maintain an active swift water rescue program and response in MFR.

SAF-3.7 The City shall continue to participate in the National Flood Insurance Program's (NFIP) Community Rating System (CRS) which provides a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed minimum NFIP requirements.

SAF-3.8 The City will continue to update and implement the City's local Hazard Mitigation Plan and Climate Action Plan.

SAF-3.9 The City will improve flood warning and information dissemination and develop robust multi-lingual educational and outreach materials accessible across multiple media forms (e.g., radio, text messaging) to publicize the potential flood risk day-to-day, emergency supplies, pet protection, key terminology, electrical safety, and evacuation routes in the case of flooding.

DAM INUNDATION

GOAL SAF-4 Land use regulations and emergency response plans reduce potential damage resulting from dam failure.

POLICIES

SAF-4.1 Maintain and update mapping of dam inundation areas within the City as new studies and projects are completed.

SAF-4.2 Develop dam failure evacuation plans in cooperation with the Riverside County Flood Control and Water Conservation District and MFR.

SAF-4.3 Discourage critical and essential uses as well as high-occupant-load building uses within designated dam inundation areas.

FIRE SAFETY

GOAL SAF-5 Damage from fire hazards is minimized through preventive measures, education, and fire protection services.

POLICIES

SAF-5.1 Continue efforts to reduce fire hazards associated with older buildings, multi-family housing, and fire-prone industrial facilities throughout the City.

SAF-5.2 Provide public safety education programs through MFR to reduce accidents, injuries and fires, as well as to train members of the public to respond to emergencies.

SAF-5.3 Continue to coordinate emergency services with Riverside County, CAL FIRE, and all other agencies and districts with fire protection powers through automatic and mutual aid agreements.

SAF-5.4 Ensure that outlying areas in the City can be adequately served by the fire communication systems as new development occurs.

SAF-5.5 Require that all dedicated open space or undeveloped areas meet specifications for wildland fire safety.

SAF-5.6 Require that all structures and facilities in the City adhere to City, State and National regulatory standards such as the International Building and Fire Codes and other applicable fire safety standards.

SAF-5.7 Involve MFR in the early design stage of all projects requiring review to ensure MFR input and appropriate modifications and fire safe design is incorporated in future development.

FIRE RESPONSE

GOAL SAF-6 Murrieta Fire & Rescue provides a timely response to fire and other emergencies.

POLICIES

SAF-6.1 Provide a total response time within the city of 6:04 minutes for medical emergencies and an effective response force (all resources dispatched to arrive at scene) for fire incidents of 10:24 minutes as measured by NFPA 1710 Standards and the Community Risk Assessment - Standards of Cover.

SAF-6.2 Ensure that each Paramedic Engine Company provides the capability to treat moderate or greater injuries, advance a hose line for fire control, and to effect a rescue of trapped occupants among other emergency operation tasks.

SAF-6.3 Provide adequate levels of emergency response personnel for all areas of the City.

SAF-6.4 Ensure sufficient personnel and appropriate apparatus to provide emergency operations and fire suppression for mid and high rise buildings and large warehouses pursuant to the Community Risk Assessment - Standards of Cover.

SAF-6.5 Locate, staff, and equip MFR apparatus to provide service to all areas within the City within a maximum of 10:24 minutes total response time for 90 percent of all large scale emergency incidents which include structure fires, mass casualty, hazardous materials or natural or man-made disasters.

SAF-6.6 Continue to incorporate Emergency Medical Dispatch into the dispatching system to provide emergency medical assistance to callers.

SAF-6.7 Strategically cross-train MFR personnel in special operations including Urban Search and Rescue, swift water rescue, and hazardous materials decontamination, wildland fire and disaster management.

SAF-6.8 Maintain and monitor a MFR Strategic Plan to address staffing and facility needs, service goals, deployment strategies, and other department goals.

SAF-6.9 Strive to achieve an Insurance Services Office (ISO) Public Protection Classification of 3 in areas with fire hydrants and 9 in areas that are not connected to an existing water district distribution system.

SAF-6.10 Review the adequacy and accessibility of the fire protection infrastructure annually relative to growth and development.

SAF-6.11 Coordinate with CAL FIRE, California's Office of Emergency Services and other local fire districts to identify strategies that ensure the capacity and resilience of escape routes potentially compromised by wildfire, including emergency evacuation and supply transportation routes.

SAF-6.12 Monitor and evaluate evacuation routes when new roads are constructed, improved or connected through the region in coordination with other agencies, such as adjacent cities and WRCOG.

SAF-6.13 Expedite reviews for building permits for the reconstruction of fire damaged structures.

FIRE HAZARDS

GOAL SAF-7 Reduced incidence of damage to life and property from wildland fires.

POLICIES

SAF-7.1 Continue to require development in very high fire hazard areas to use fire-resistant building materials and landscaping, and to meet the required codes, standards and specifications for fuel modification, access, and water facilities.

SAF-7.2 Require all new development to be located in or adjacent to wildland areas to assess its vulnerability to fire and its potential as a source of fire through a Fire Protection Plan analysis.

SAF-7.3 Encourage the use of development features such as roads and irrigated/landscaped open space to buffer homes from wildland fire.

SAF-7.4 Promote community education about preventing wildfire ignition, using fire-resistant building features, creating defensible space around homes, evacuation routes, and legal brush clearance requirements.

SAF-7.5 Continue to implement a proactive vegetation management program to reduce fire hazards on private properties.

SAF-7.6 MFR will consider different forms of mitigation for new residential development in Very High Fire Zones to minimize potential fire hazards.

SAF-7.7 Locate essential public facilities outside Very High Fire Zones when feasible with consideration that the local surrounding cities are also growing and development

may fill in between and essential public facilities may be necessary in these areas.

SAF-7.8 Update General Plan Exhibit 12-8, Very High Fire Hazard Severity Zones, to maintain consistency with CAL FIRE's recommendations.

HAZARDOUS MATERIALS AND WASTE

GOAL SAF-8 A community that is protected from the harmful effects of hazardous materials, hazardous waste, and environmental contamination.

POLICIES

SAF-8.1 Require geologic investigations for sites of proposed uses that manufacture, handle, or store hazardous or explosive materials.

SAF-8.2 Ensure that land uses involved in the production, storage, transportation, handling, or disposal of hazardous materials are located and operated to reduce risk to other land uses.

SAF-8.3 Designate appropriate routes for transportation of hazardous materials that are used or produced by facilities in the City.

SAF-8.4 Require that new pipelines and other channels carrying hazardous materials avoid residential areas and other sensitive land uses to the greatest extent possible.

SAF-8.5 Raise public awareness of appropriate disposal for household hazardous waste, and publicize collection events and locations.

SAF-8.6 Promote the use of integrated pest management techniques to keep City properties free of herbicides and pesticides.

SAF-8.7 Encourage and educate residents and businesses to implement integrated pest management principles and reduce or discontinue the use of pesticides and herbicides on their property.

SAF-8.8 Comply with the Riverside County Hazardous Waste Management Plan.

SAF-8.9 Support Caltrans and California Highway Patrol efforts to ensure safe transportation of hazardous materials on freeways.

SAF-8.10 Ensure that all MFR personnel are trained and ready to operate at the level of Hazardous Materials First Responder.

SAF-8.11 Coordinate with other agencies to improve the containment and clean up of hazardous material spills.

SAF-8.12 Ensure that MFR personnel receiving training to achieve the Hazardous Materials Technician level.

SAF-8.13 When approving new development, ensure that the site:

- Is sufficiently surveyed for contamination and remediation, particularly for sensitive uses near existing or former toxic or industrial sites.
- Is adequately remediated to meet all applicable laws and regulations, if necessary.
- Is suitable for human habitation.
- Is protected from known hazardous and toxic materials.
- Does not pose higher than average health risks from exposure to hazardous materials.

SAF-8.14 Work with the appropriate Federal, State, regional, and local agencies to identify previously unidentified contaminated sites in the City, particularly on sites with a high likelihood of past contamination, such as old gas stations or industrial sites, and work with the property owners and applicable agencies to remediate them.

POLICE PROTECTION

GOAL SAF-9 High-quality and timely police services are provided to all residents and businesses in Murrieta.

POLICIES

SAF-9.1 Seek to reach and maintain police officer and civilian support employee staffing levels to effectively and efficiently address the public safety needs, measured through established response times (as shown in *Table 12-3*, *Target Response Times*), crime statistics, crime clearance rates, and community quality of life issues.

SAF-9.2 Endeavor to respond within six minutes for all Priority 1 calls, 15 minutes for Priority 2 calls, and 35 minutes for Priority 3 calls.

SAF-9.3 Consider options for locating field stations throughout the City to improve response times for Priority 1 calls and foster relationships with local residents.

SAF-9.4 Maintain and implement a Police Department Strategic Plan to address staffing and facility needs, service goals, deployment strategies, and other department goals.

SAF-9.5 Explore options for funding needed facilities, staff, and equipment.

SAF-9.6 Ensure that new development can be served by police communication systems and provide for the construction of radio towers (repeater sites) in outlying areas.

SAF-9.7 Evaluate the feasibility of adding cellular services for police communication to accommodate Mobile Data Browsers (MBD) technology.

SAF-9.8 Maintain a S.W.A.T. team that can respond to barricades and other tactical response needs.

GOAL SAF-10 The Police Department coordinates with neighborhoods and community members to enhance safety and continually improve services.

POLICIES

SAF-10.1 Collaborate with school districts, businesses, nonprofit organizations, and community members, including neighborhood watch groups, to maintain safety throughout the City.

SAF-10.2 Provide educational programs that deter unsafe and criminal behavior among youth, including the Youth Accountability Team, Youth Court, and School Resource Officers.

SAF-10.3 Maintain positive relationships with the community through communication and responsiveness to concerns.

SAF-10.4 Promote participation in the Crime Free Multi-Housing Program among existing multi-family communities.

GOAL SAF-11 Design of the physical environment promotes community safety and reduces opportunities for criminal activity.

POLICIES

SAF-11.1 Involve the Police Department in the development review process to address safety concerns, access issues, and potential traffic conflicts, and identify opportunities to apply CPTED principles.

SAF-11.2 Continue to require new apartment communities to participate in the Crime Free Multi-Housing Program.

SAF-11.3 Coordinate efforts between the Police Department and Planning Department to develop guidelines for implementation of CPTED principles.

SAF-11.4 Continue to ensure that each development or neighborhood in the City has adequate emergency ingress and egress.

EMERGENCY PREPAREDNESS

GOAL SAF-12 Murrieta is prepared to coordinate effective response and recovery efforts for major emergencies.

POLICIES

SAF-12.1 Maintain an effective, coordinated and up-to-date Emergency Operations Plan in partnership with the Riverside County and other agencies.

SAF-12.2 Support a safe, secure, and technologically advanced Emergency Operations Center (EOC) to coordinate the City's response to disasters, and maintain training of City personnel in the operations of the EOC.

SAF-12.3 Review and test the City's Emergency Operations Plan periodically to note any deficiencies or practices requiring modification.

SAF-12.4 Provide training to maintain City staff proficiency in implementation of the Emergency Operations Plan, for all staffing levels.

SAF-12.5 Provide public outreach, presentations, and information that prepares residents and businesses to safeguard life and property during and immediately after emergencies.

SAF-12.6 Participate in regularly scheduled disaster exercises to better prepare Police, Fire, Public Works and other City employees with disaster responsibilities.

SAF-12.7 Continue to participate in maintaining the Riverside County Multi-Jurisdictional Local Hazard Mitigation Plan, and incorporate it into City planning efforts as appropriate.

12.6 IMPLEMENTATION OF THE ELEMENT

Ensuring safety in Murrieta begins with understanding the hazards that are present. Maintaining current information and maps of hazards provides a basis for Citywide planning, while site-specific analysis is often needed to evaluate geologic and seismic hazards.

Land use policy in the General Plan and Municipal Code will guide efforts to limit damage from known hazards. Project review provides another opportunity to prevent harm to new developments and their inhabitants. Inspections and code enforcement promote compliance with City codes for building and fire safety, as well as hazardous materials handling. Engineering can mitigate geologic and seismic hazards.

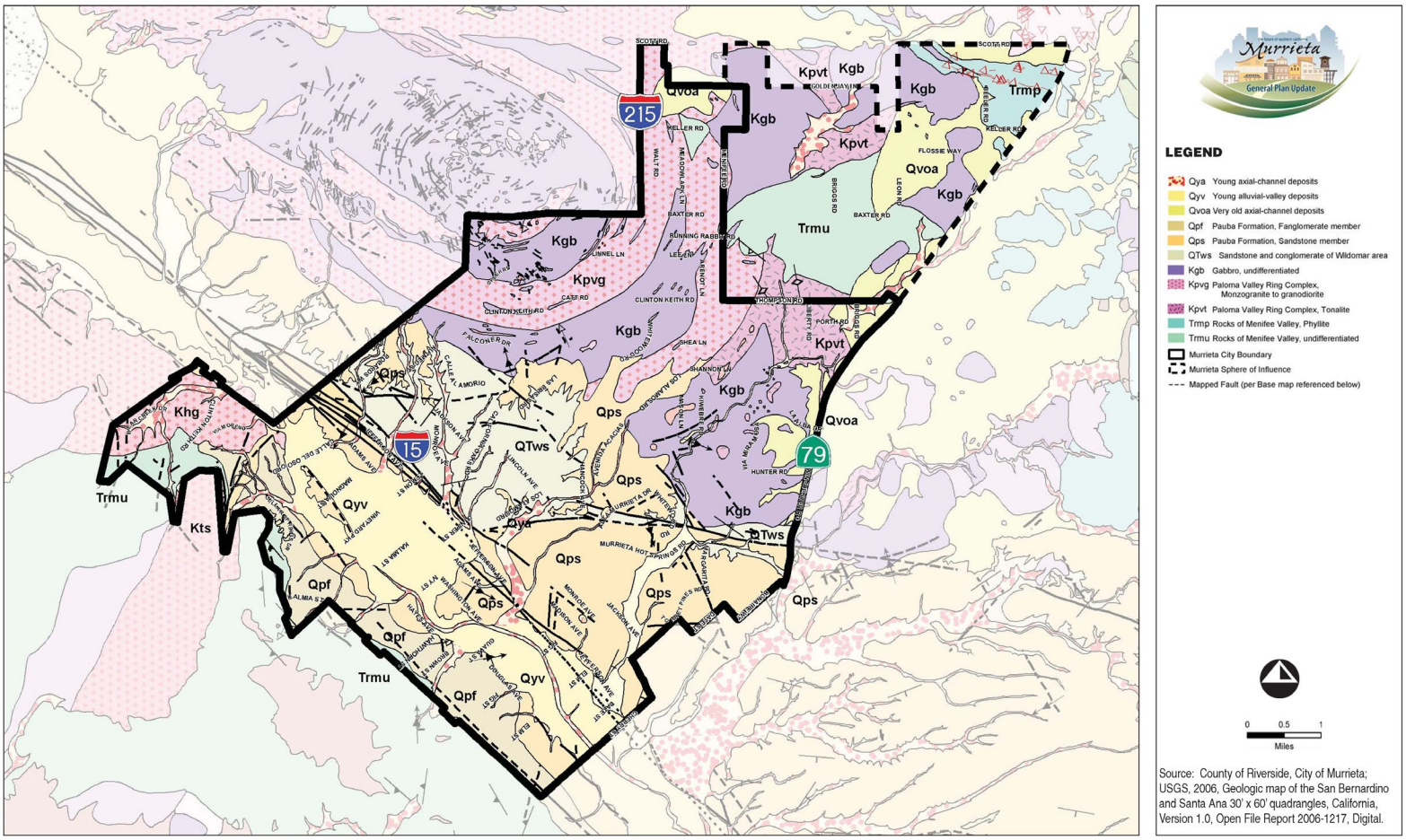
Multiple levels of government are involved in safety. The City must follow State and Federal laws and abide by County plans. The City coordinates with agencies from the County to Federal level in planning, enforcement, and emergency response.

The Emergency Operations Plan is intended to coordinate the City response to major emergencies. Under the EOP, emergency response is managed by the Emergency Operations Center and multiple City departments have implementation responsibility for the EOP.

Responses to smaller-scale emergencies are handled every day by MFR and the Police Department, which have the combined capacity to handle emergencies caused by any of the hazards described in the Safety Element — or at least to initiate a response, as in the case of hazardous materials accidents.

Members of the public and business community are important partners in maintaining safety, whether they are helping to prevent crime or preparing to respond appropriately in the event of an emergency. The Police Department and MFR offer many opportunities for community members to become directly involved in public safety with programs such as the Youth Accountability Board and CERT.

Exhibit 12-1, Regional Geology Map



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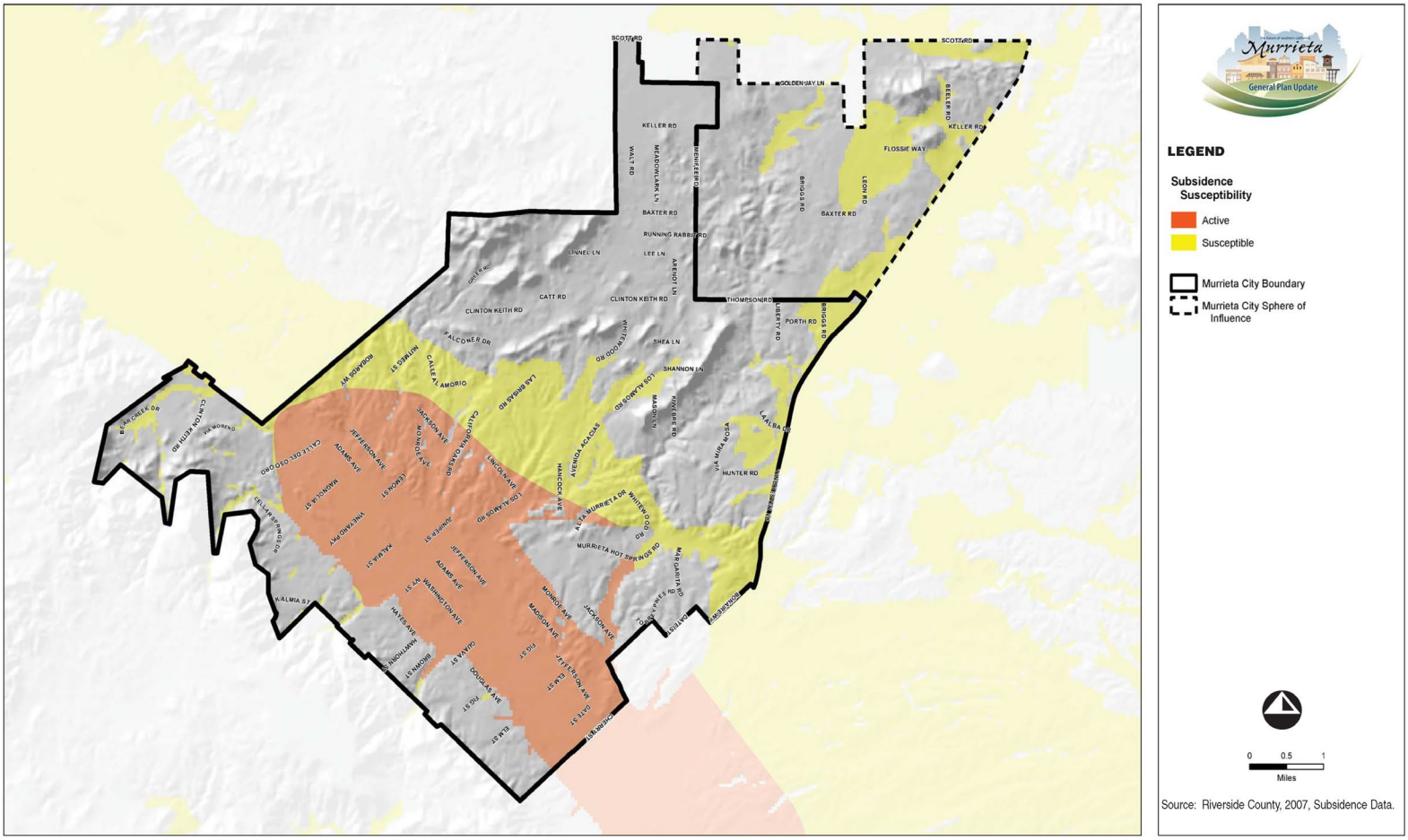
Regional Geology Map

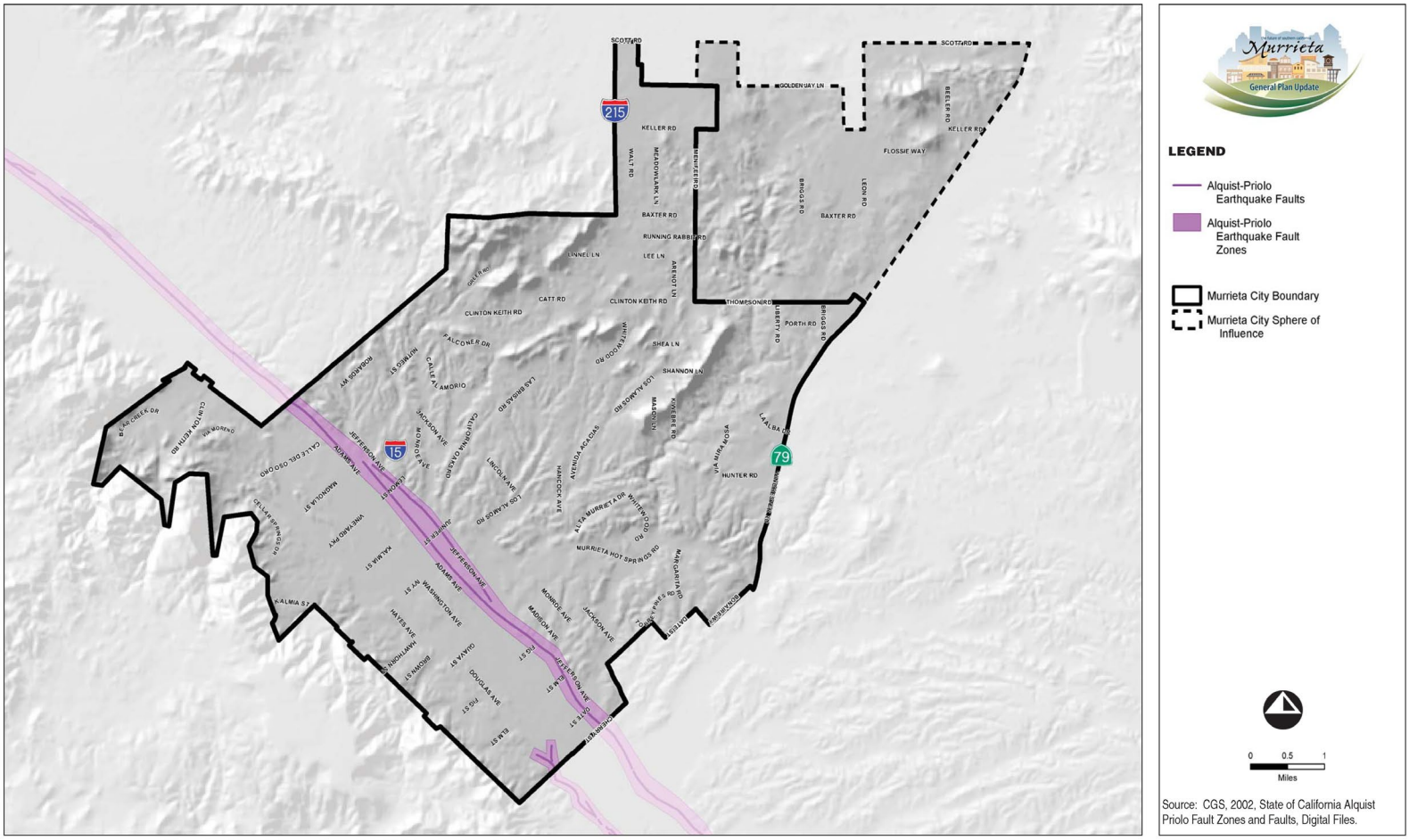
Exhibit 12-1

Exhibit 12-2, Subsidence Susceptibility Map



Subsidence Susceptibility Map
Exhibit 12-2

Exhibit 12-3, Alquist-Priolo Earthquake Fault Zone Map



Alquist-Priolo Earthquake Fault Zone Map

Exhibit 12-3

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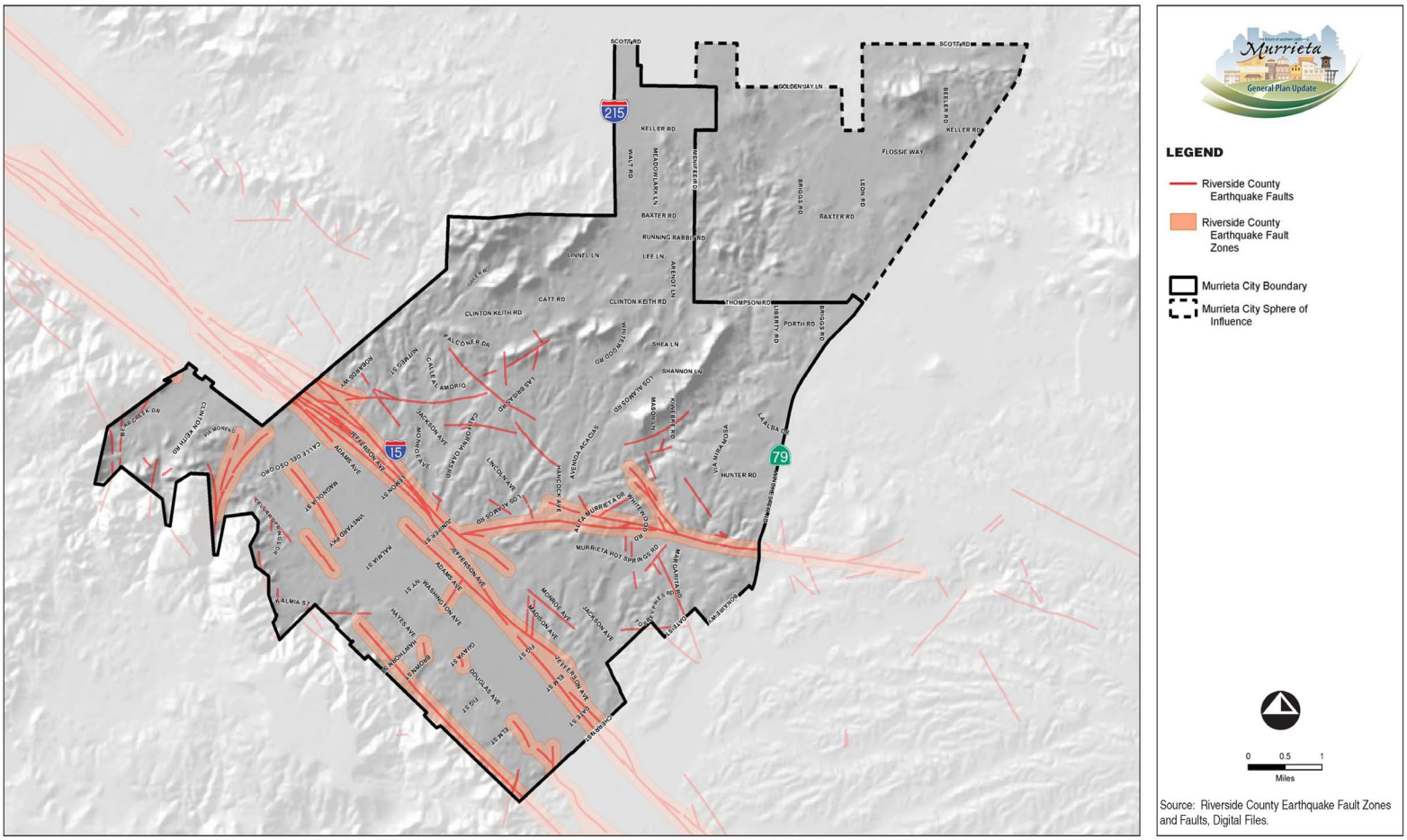
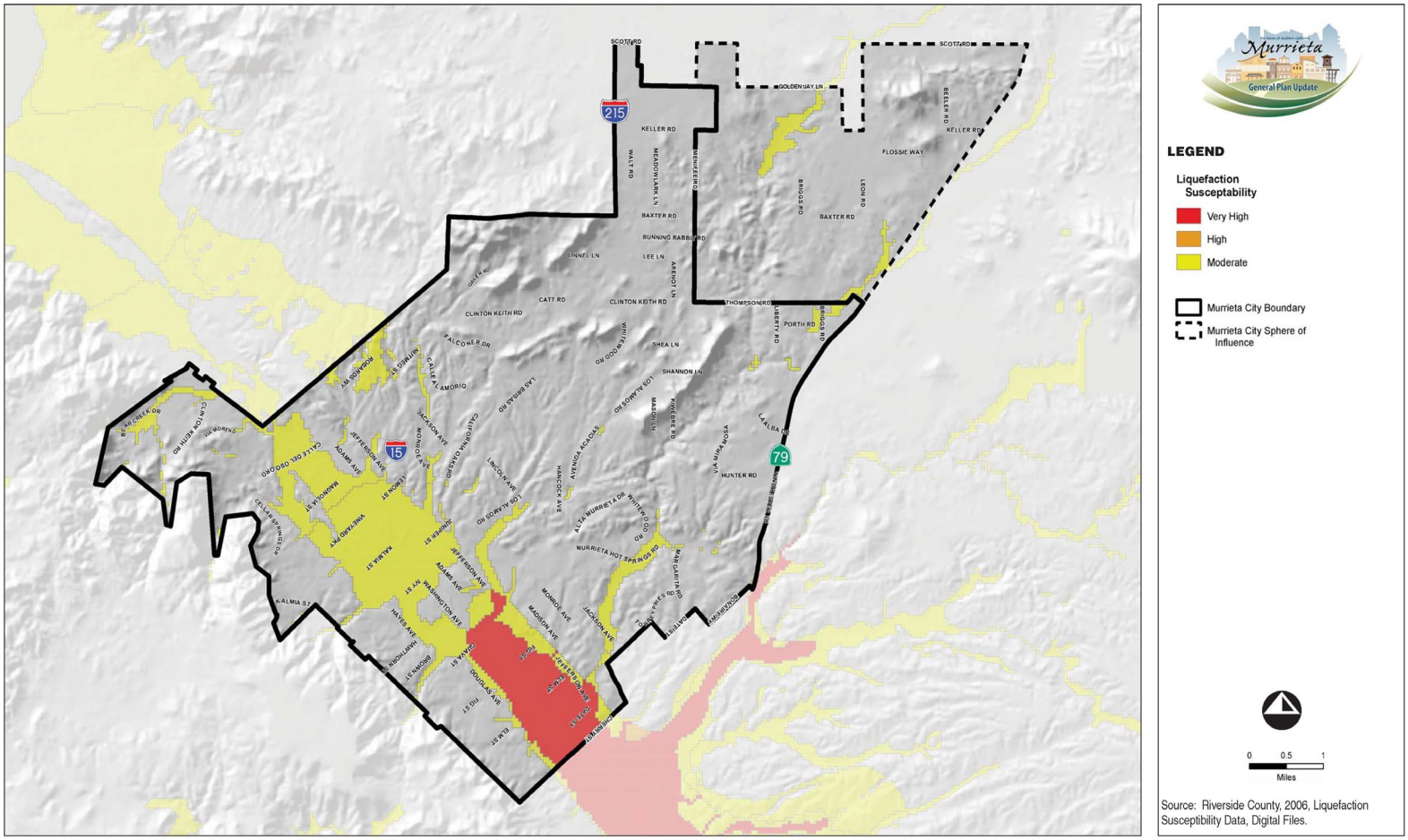
Exhibit 12-4, Riverside County Fault Hazard Map



Riverside County Fault Hazard Map

Exhibit 12-4

Exhibit 12-5, Liquefaction Susceptibility Map



Liquefaction Susceptibility Map

Exhibit 12-5

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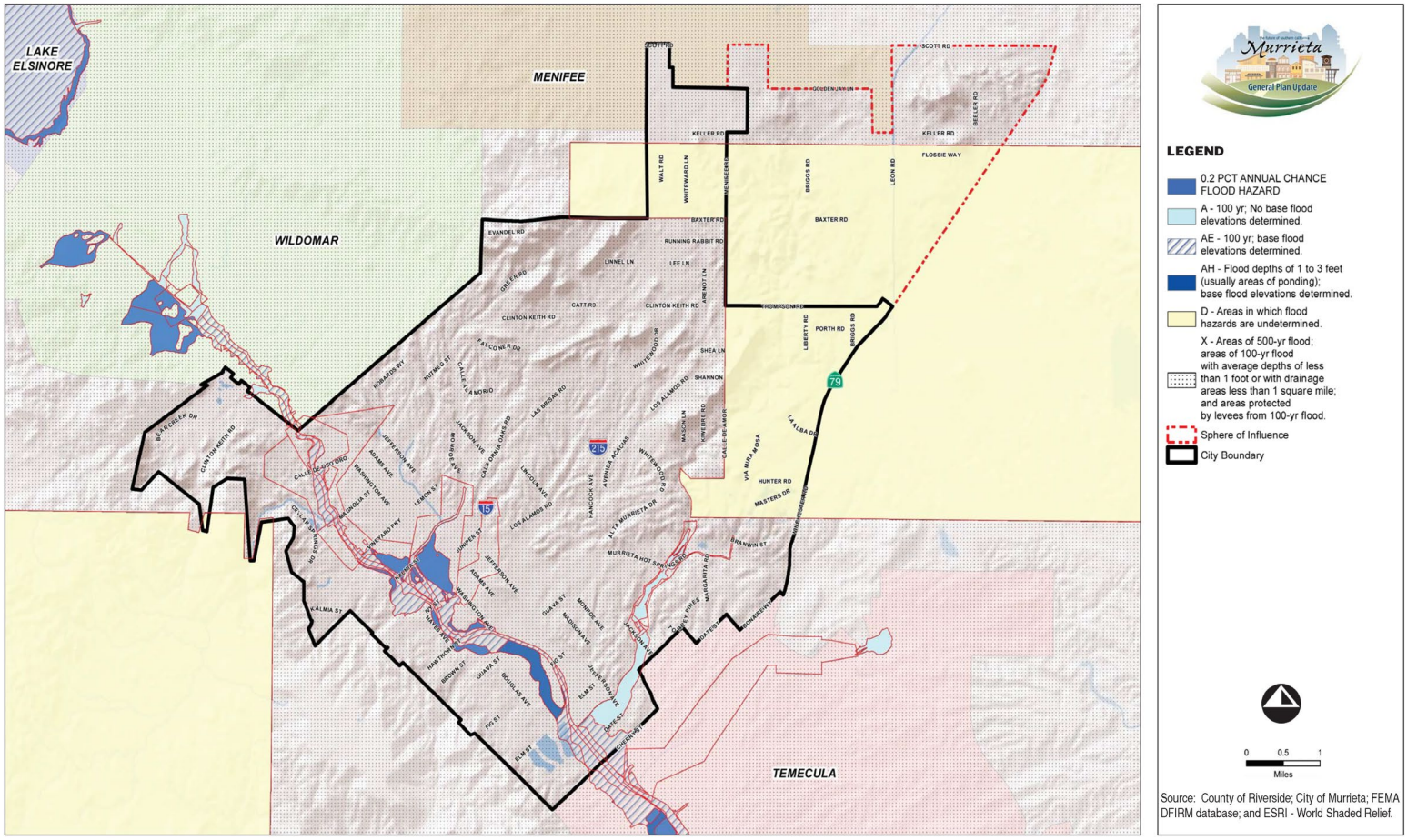
Exhibit 12-6, FEMA Flood Zones



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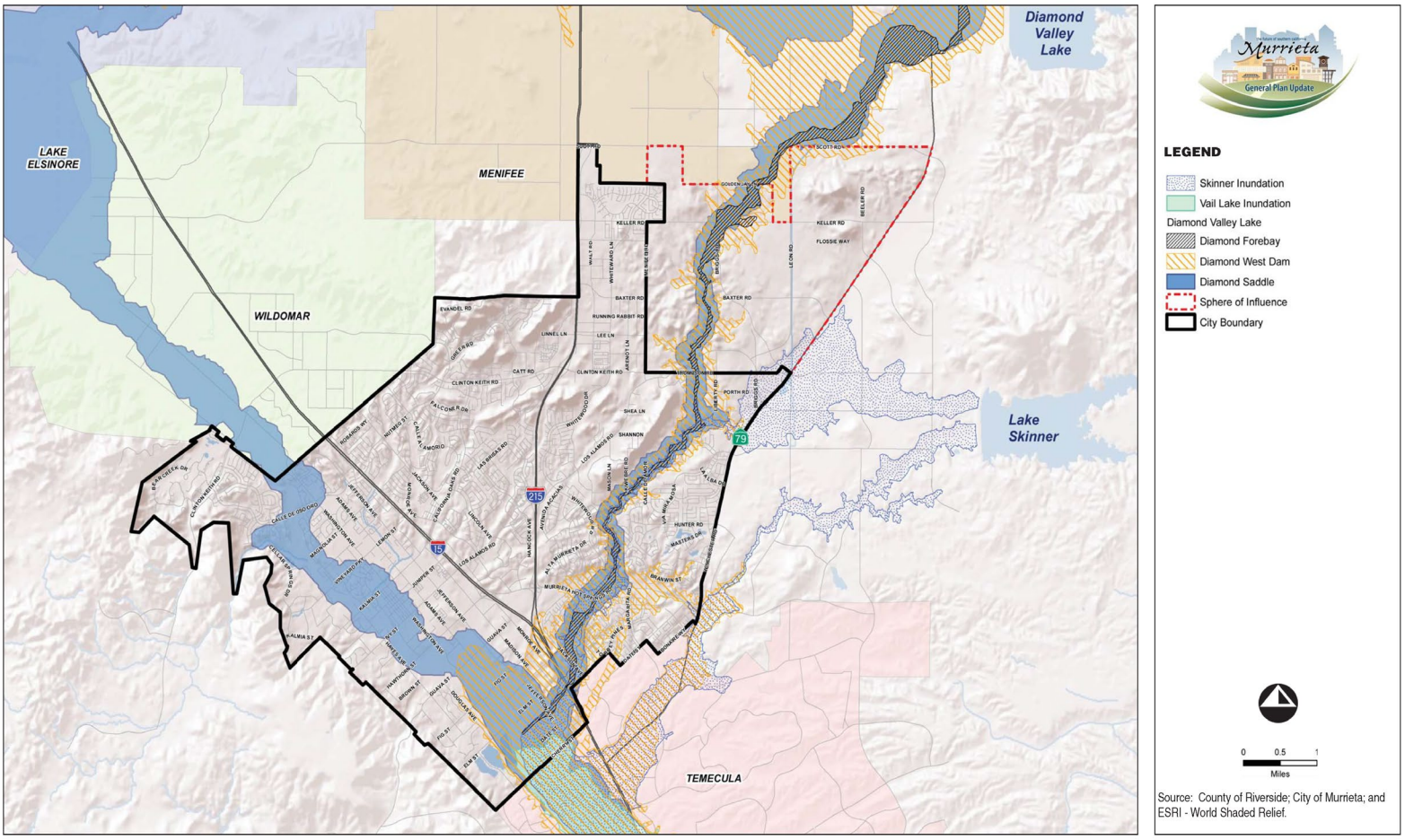
FEMA Flood Zones

Exhibit 12-6

Exhibit 12-7, Dam Inundation



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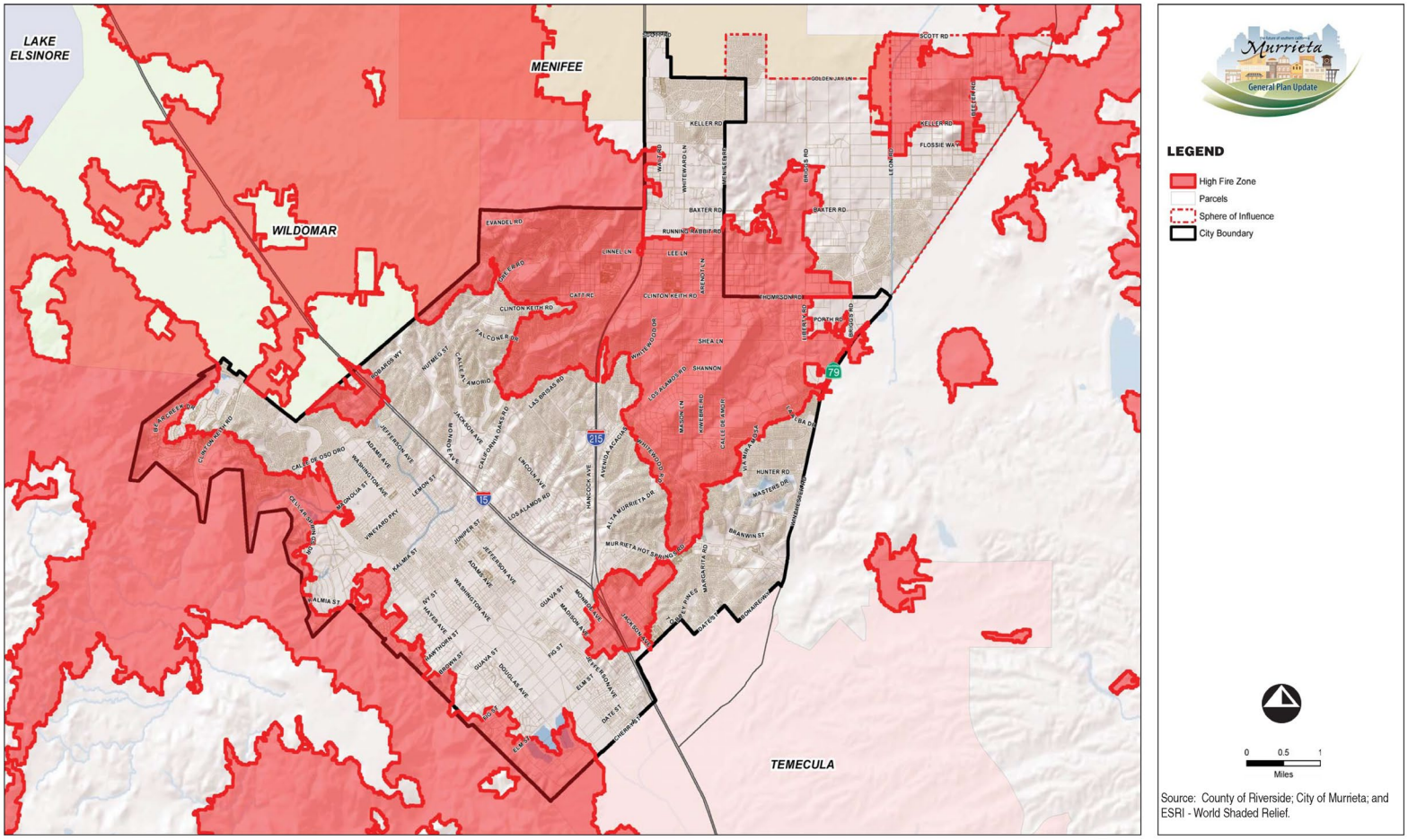
Dam Inundation

Exhibit 12-7

Exhibit 12-8, Very High Fire Hazard Zones



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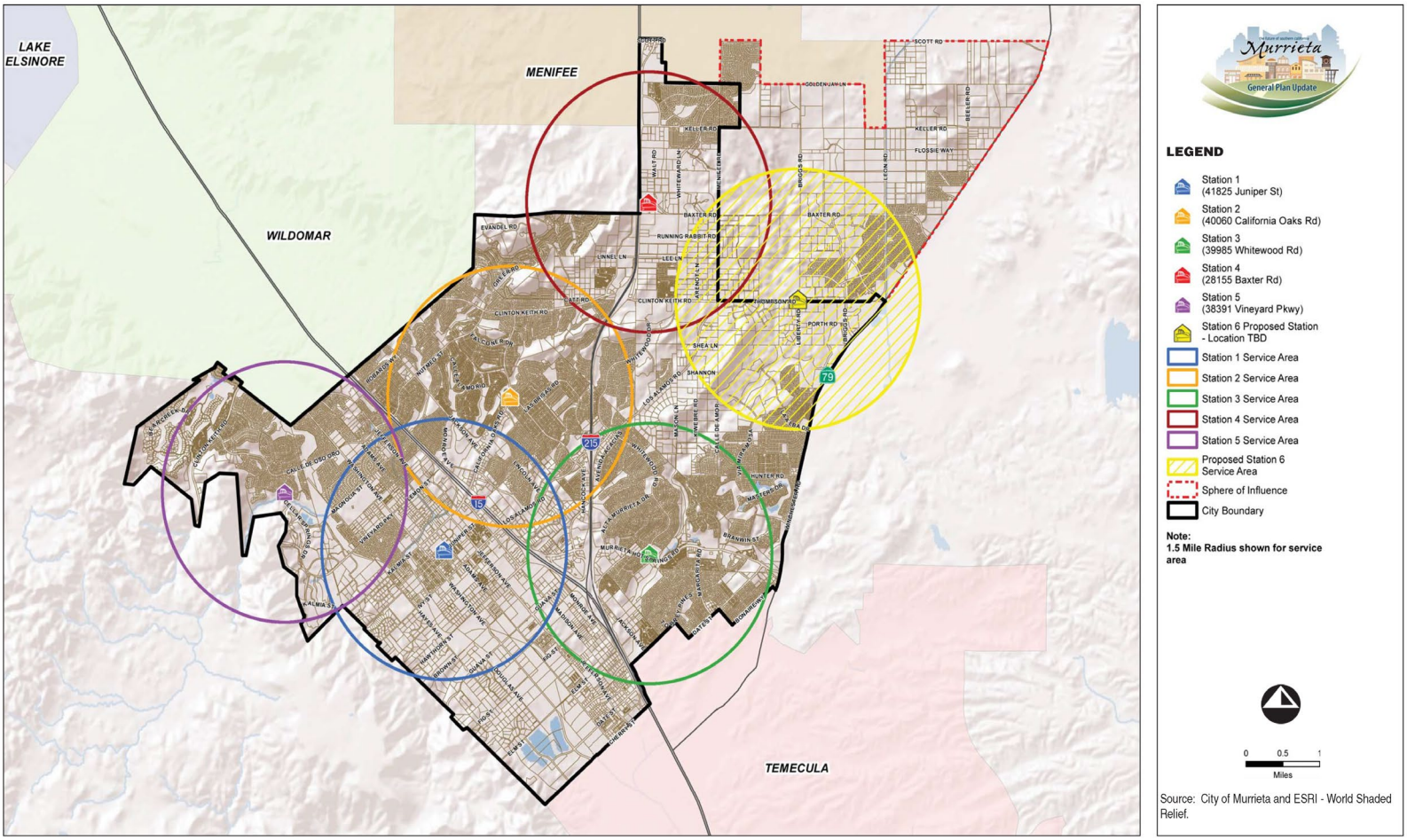
High Fire Hazard Zones

Exhibit 12-8

Exhibit 12-9, Fire Station Service Areas



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Fire Station Service Areas

Exhibit 12-9

City of Murrieta

2014-2021 Housing Element

Adopted October 8, 2013

Prepared For:

City of Murrieta
One Town Square,
24601 Jefferson Avenue
Murrieta CA 92562

Prepared By:

Environmental Science Associates
626 Wilshire Boulevard, Suite 1100
Los Angeles, CA 90017

Murrieta
the future of southern california

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Introduction

Section 1

1.1 - Housing Element Purpose

The Housing Element as part of the Murrieta General Plan is developed to ensure that the City establishes policies, procedures and incentives in its land use planning and redevelopment activities that result in the maintenance and expansion of the housing supply to adequately accommodate households currently living and expected to live in Murrieta. The Housing Element institutes policies that will guide City decision-making, and establishes an action program to implement housing goals through the year 2021.

The Housing Element has been designed to address key housing issues in the City. Foremost among these issues is ensuring a balance of housing types, at a variety of costs is available to meet the needs of all economic segments found within Murrieta. Consequently, the Housing Element makes provisions for affordable and accessible housing for special needs groups in the community, and is designed to provide guidance in the maintenance of existing affordable housing. These commitments are an expression of the statewide housing goal of "early attainment of decent housing and a suitable living environment for every Californian", as well as an expression of the City of Murrieta's goal for the attainment of a suitable living environment for every household.

1.2 - New State Legislation

The Housing Element addresses new State legislation, which mandates that the following reforms be included in the Housing Element update to facilitate and expedite the construction of affordable housing. This new legislation targets five specific areas including:

- **AB 162:** Requires the City, upon adoption of the Housing Element, to identify specific flood hazard zones in the Land Use Element and specific floodwater and groundwater recharge areas in the Conservation and Safety Elements.
- **SB 244:** Requires the City, upon the adoption of a Housing Element, to update the Land Use Element to include data and analysis, goals, and implementation measures regarding unincorporated island, fringe, or legacy communities and their infrastructure needs.
- **SB 812:** In addition to the existing special needs groups, the City must include an analysis of the housing needs for developmentally disabled persons.
- **AB 1867:** Under certain conditions, the City can now count multi-unit homeownership units that have been converted to affordable units toward their RHNA allocation.
- **SB375 Implications:** For jurisdictions that do not submit their adopted 2014-2021 housing element update within 120 days of the October 2013 deadline, their housing element updates revert to a four-year cycle.

1.3 - Citizen Participation

California Government Code requires that local governments make a diligent effort to achieve public participation from all economic segments of the community in the development of the housing element. In the preparation of the Housing Element Update, a number of organizations and agencies that provide housing, or housing related services, were contacted. Stakeholder groups that have been identified as influential to the development of housing and the provision of services in the community include, but are not limited to:

- Riverside County Housing Authority
- Riverside County Econ Development Agency
- Fair Housing Council
- California Housing Partnership
- Coachella Valley Housing Coalition
- Family Support Program
- Homeless Coalition for Riverside Co.
- Riverside County Office on Aging
- Affirmed Housing Group
- Abode Communities
- Jamboree Housing Corporation
- National CORE
- Community Food Pantry of Murrieta
- St. Martha's Catholic Church
- Single Mom's Life Skills Program
- Senior Citizens Service Center

The City held two workshop meetings prior to the submittal of this Housing Element draft to HCD for review. The first meeting with the Planning Commission took place on February 13, 2013 and was intended to provide Commissioners and the public with general information regarding the Housing Element (i.e. contents, process and information on the RHNA). A second workshop with the City Council occurred on March 5, 2013 and was streamlined to focus on the draft Housing Element and next steps for the update process. For both meetings the Housing Element workshop was noticed on the City's website, at City Hall, and in other public places such as the Senior Center. Stakeholder groups were also identified and a flyer and letter invitation to the meetings was distributed several weeks before the first workshop. Informational materials for the public workshops are presented in Appendix C.

Despite the City's efforts to engage the public, no public comments were made at Planning Commission meeting regarding the Housing Element. At the City Council meeting several stakeholder groups including the Fair Housing Council of Riverside County were present. Two residents addressed the Council during the meeting to express their concerns regarding AB 32 and mandates to reduce the effects of climate change. The City Council also asked questions regarding the consequences of having an uncertified Element and the process for achieving certification. No comments on the actual draft Housing Element were provided. The Housing Element City Council meeting was covered by the local media, with The Press Enterprise publishing an article about the workshop the following day.

On April 25, 2013, the State Department of Housing and Community Development issued confirmation that the Housing Element was found to be in compliance with State law. On September 11, 2013, the Planning Commission prepared their recommendation of the Housing Element for the City Council and on October 8, 2013, the Housing Element was adopted unanimously by the City Council. These meetings were noticed and open for public comment on the final Housing Element draft. Following adoption, the Final Housing Element was sent to the State Department of Housing and Community Development (HCD) for final State certification.

1.4 - Consistency with State Planning Law

The Housing Element is one of the seven General Plan elements mandated by the State of California. Sections 65580 to 65590 of the California Government Code contain the legislative mandate for the housing element. State law requires that the City's Housing Element consist of "an identification and analysis of existing and projected housing needs and a statement of goals, policies, quantified objectives, financial resources, and scheduled programs for the preservation, improvement and development of housing" (Section 65583). In addition, the housing element shall identify adequate sites for housing, including rental housing, factory-built housing, and mobile homes, and shall make adequate provision for the existing and projected needs of all economic segments of the community.

1.5 - Detailed Components of the Housing Element

There is no single approved format for a Housing Element. Instead, State law defines of the issues that must be addressed. A housing element should clearly identify and address, at a minimum, each component listed below:

1. Review of the existing Housing Element.
2. An assessment of existing and projected housing and employment trends to assess a locality's housing needs for all income levels.
3. An inventory of resources relevant to meeting housing needs.
4. An inventory of constraints relevant to the meeting of these needs.
5. A statement of the community's goals, quantified objectives, and policies relative to the maintenance, preservation, improvement and development of housing.
6. A program that sets forth a five-year schedule of actions the local government is undertaking or intends to undertake to implement the policies and achieve the goals and objectives of the housing element.

1.6 - General Plan Consistency

The Housing Element is one of seven elements of the Murrieta General Plan. The goals, policies, actions and programs within this element relate directly to, and are consistent with, all other elements. The City's Housing Element identifies programs and resources required for the preservation, improvement and development of housing to meet the existing and projected needs of its population. Through the regulation of the amount and variety of open space and recreation areas, acceptable noise levels in residential areas, and programs to provide for the safety of the residents, policies contained in General Plan elements directly affect the quality of life for all Murrieta citizens.

The Housing Element is affected by development policies contained in the Land Use Element, which establishes the location, type, intensity and distribution of land uses throughout the City, and defines the land use build-out potential. In designating residential development, the Land Use Element places an upper limit on the number and types of housing units constructed in the City. The acreage designated for a range of commercial and office uses creates employment

opportunities for various income groups. The presence and potential for jobs affects the current and future demand for housing at the various income levels in the City.

The Circulation Element of the General Plan also affects the implementation of the Housing Element. The Circulation Element establishes policies for a balanced circulation system in the City. Consequently the Housing Element must include policies that take into account the types of infrastructure essential for residential housing units in addition to mitigating the effects of growth in the City.

The Housing Element utilizes the most current data available, and includes 2012 California Department of Finance data when possible, 2010 Census data and the 2009-2011 American Community Survey. All figures represented in the Housing Element are consistent with existing and projected population, employment and housing figures presented by county, State, national and non-profit agencies.

The Housing Element has been reviewed for consistency with the City's other General Plan elements, and the policies and programs in this Element are consistent with the policy direction contained in other parts of the General Plan. As portions of the General Plan are amended in the future, the Housing Element will be reviewed to ensure that internal consistency is maintained.

1.7 - Housing Element Organization

This Housing Element updates the Housing Element adopted by the City in 2011. The updated Murrieta Housing Element is comprised of the following major components:

1. **Housing Plan** to address Murrieta's identified housing needs, including housing goals, policies and programs.
2. **Quantified Objectives** to estimate anticipated and potential affordable housing development during the planning period;
3. **Community Profile** with an analysis of the City's population, household and employment base, and the characteristics of the housing stock;
4. **Housing Needs** including an updated evaluation of housing need, including the housing needs of very low-income households and the disabled;
5. **Housing Constraints** examining governmental and non-governmental constraints on the production, maintenance, and affordability of housing;
6. **Housing Resources** presenting an inventory of potential housing sites in the community; and
7. **Progress Report** to assess past housing accomplishments.

Housing Plan

Section 2

The Housing Plan presented in this section includes goals, policies, and programs focused specifically on housing in the City of Murrieta. The general goal of the Housing Element is to ensure that all residents have decent, safe, sanitary and affordable housing regardless of income. In order to achieve this general goal, five specific goals have been established to guide the development, redevelopment and preservation of a balanced inventory of housing to meet the needs of present and future residents of the City. Murrieta's housing goals address the following five major areas:

1. Increased opportunities for affordable housing;
2. Conservation of the City's existing housing stock;
3. Removal of constraints to the construction of affordable housing;
4. Equal housing opportunity; and
5. Identification of adequate sites to achieve a variety and diversity of housing.

For each of the five goals identified, specific policies and programs are also summarized within the Housing Plan. Individual policies and actions included in this element are intended to provide a wide variety of programs and tools to implement the City's General Plan goals. The housing plan includes programs currently in existence as well as new actions which have been added to address the City's unmet housing need. Actual programs will be implemented at the discretion of the City in order to meet established objectives. It should be noted that the listing of a potential funding source of a particular program and/or action does not signify that money has been allocated or appropriated as a source of funding for such a program and/or action.

Goal 1: Provide adequate housing opportunities throughout the City of Murrieta.

Murrieta strives to achieve a balanced community, with housing units available for all income segments of the population. The existing housing stock is in good condition, with majority of the units constructed during or after the 1980's, providing a variety of affordable housing options. The intent of this goal is to assist in the provision of adequate housing that continues to meet the needs of the community, including both renter and owner households.

Policy 1.1: Provide a range of residential development types in Murrieta, including low density single-family homes, moderate density townhomes, higher density multifamily units, and residential/commercial mixed use in order to address the City's share of regional housing needs.

Policy 1.2: Continue, when funding is available, to purchase properties and land in order to construct affordable housing or to purchase covenants to create new affordable units.

Policy 1.3: Facilitate development of senior and low-income housing through use of financial and/or regulatory incentives.

Policy 1.4: Provide homeownership assistance to low- and moderate-income households.

Policy 1.5: Design new higher-density residential projects at a scale, (number of units, height, etc.) that are compatible in design with adjacent residential areas.

Policy 1.6: Encourage lot consolidation in the Historic Murrieta Specific Plan area in order to cohesively redevelop larger areas of the City.

Actions and Programs

Action 1.1 – General Plan Review

The City of Murrieta recognizes that the General Plan and City's ~~Zoning Ordinance~~Development Code are crucial tools that guide development in the City. These tools can also create barriers if they are not reviewed and updated to reflect the needs of the community. To address and prevent development barriers the City will periodically review the Land Use Element of the General Plan, as well as the ~~Zoning~~Development Code and Subdivision Ordinances, to ensure that housing opportunities for all income groups are provided. In 2011 the City Council adopted the General Plan 2035 and in late 2012 the City was in the process of updating the Zoning Code to be consistent with the changes made to the General Plan. To simplify the General Plan, the number of land use designations was reduced to allow for more flexibility in new development. Within the Zoning Code update process any barriers to affordable housing that are identified, where appropriate, will be removed. Once the Zoning Code is updated for consistency with the General Plan, the City will review the Zoning Code on a biannual basis, periodically correcting inconsistencies that may exist.

- *Responsible Agency: Murrieta Planning Division*
- *Timeframe: Ongoing, 2014-2021*

- *Potential Funding Source: General Fund*
- *Objective: Periodically review the Zoning Code for inconsistencies and standards that may prevent the development of affordable housing.*

Action 1.2 – Land Use Database

Throughout the City of Murrieta there are a number of vacant parcels ranging in size that provide opportunities for the development of affordable and market rate housing. In order to monitor and more carefully plan residential development in the City, Murrieta will maintain, on an ongoing basis, the comprehensive land use database identifying parcels and/or structures suitable for residential development and/or redevelopment. This will allow the City to direct affordable housing developers to areas in the City with the appropriate zoning and acreage to develop an affordable housing project.

- *Responsible Agency: Murrieta Planning Division*
- *Timeframe: Ongoing, 2014-2021*
- *Potential Funding Source: General Fund*
- *Objective: Provide information on development opportunities to interested developers online, at City Hall and in other public places.*

Action 1.3– First-Time Home Buyer Assistance Program

In addition to the First-Time Home Buyer Program offered by the County of Riverside the City of Murrieta has established a City operated first-time homebuyer program. The City's program provides up to 20 percent down payment assistance to qualified home buyers. This program is intended to coincide with Action 1.4, Land and Property Acquisition Program, so that as the City purchases properties and assists in the development of affordable housing, residents can seek assistance in purchasing the affordable units that are developed. During the 2008-2014 planning period, the elimination of the City's Redevelopment Agency, has resulted in a loss of a permanent funding source for this program. For the 2014-2021 planning period the City will investigate new funding opportunities and administer funds as they become available. If and when a permanent funding source is identified, the City will provide information about the program at City Hall, on the City's website and in other public places to increase awareness.

- *Responsible Agency: Murrieta Housing Authority*
- *Timeframe: Ongoing, 2014-2021*
- *Potential Funding Source: General Fund; Additional funding sources needed.*
- *Objective: Investigate new funding opportunities and administer funds as they become available. If and when a permanent funding source is identified, the City will provide information at City Hall, on the City's website and in other public places to increase awareness.*

Action 1.4– Land and Property Acquisition Program

The City of Murrieta recognizes that one of the most significant barriers to affordable housing is the acquisition of the property on which to construct affordable housing. During the 2008-2014 planning period, the City budgeted approximately $4.8 million in redevelopment set-aside funds to purchase properties in and around the Historic Murrieta Specific Plan area in order to facilitate the development of affordable units. In addition to purchasing land the City of Murrieta also strives to provide gap financing and/or land write downs for the construction of multifamily developments that are constructed with established affordability covenants. Applications are reviewed on a case by case basis to determine whether a developer qualifies for assistance from the Housing Authority. The City provides information on affordable housing financing at City Hall.

While the City was able to successfully purchase 10.4 acres of land during the previous planning cycle, the elimination of the City's Redevelopment Agency, has resulted in a loss of a permanent funding source for this program. For the 2014-2021 planning period the City will investigate new funding opportunities and administer funds as they become available. If and when a permanent funding source is identified, the City will provide information about the program at City Hall, on the City's website and in other public places to increase awareness.

- *Responsible Agency: Murrieta Housing Authority and Planning Division*
- *Timeframe: Ongoing 2014-2021*
- *Potential Funding Source: Riverside County HOME funds; Additional funding sources needed.*
- *Objective: Investigate new funding opportunities and administer funds as they become available. If, and when, a permanent funding source is identified, the City will provide information at City Hall, on the City's website and in other public places to increase awareness.*

Action 1.5 - Lot Consolidation Program

Parcels located in downtown Murrieta as well as the Downtown~~Historic~~ Murrieta Specific Plan area and the TOD Overlay Program area tend to be smaller and in some cases, narrow and/or shallow in size, adding an additional constraint to the development of housing. In order to encourage the development of residential and mixed-use projects, the City offers incentives such as a reduction in development standards (i.e. lot size, parking, and open space requirements) to encourage and facilitate consolidation of adjacent parcels to allow for a larger cohesive development. The City, with assistance from Riverside County, may also offer to subsidize a portion of development fees to encourage lot consolidation and to promote more intense residential and mixed use development on vacant and underutilized sites within the downtown Murrieta region.

- *Responsible Agency: Murrieta Housing Authority and Planning Division*
- *Timeframe: Ongoing, as projects are submitted to the Murrieta Planning Division*
- *Potential Funding Source: General Fund*
- *Objectives: The City will continue to promote the program at City Hall, on its website and will evaluate requests for modifications on a case by case basis*

Action 1.6 – Large Sites Program

Most assisted housing developments utilizing State or federal financial resources include 50 to 150 units on parcels ranging from 3 to 7 acres in size. To facilitate the subdivision of larger parcels (greater than 15 acres) located in the TOD Overlay Program area, the City provides incentives and technical assistance to facilitate and encourage development of a variety of housing types and affordability consistent with typical developments affordable to lower income households. The City offers on a case-by-case basis the following incentives for the development of affordable housing, including, but not limited to: priority processing for subdivision maps that include affordable housing units, expedited review for the subdivision of larger sites into buildable lots where the development application can be found consistent with the General Plan, applicable Specific Plan and master environmental impact report, financial assistance (based on availability of federal, State, local foundations, and private housing funds, and modification of development requirements, such as reduced parking standards for seniors, assisted care and special needs housing. To determine the effectiveness of this program, the City will monitor the number of large sites available to be developed for a variety of income groups. The planning division will monitor this program and assess its effectiveness on a bi-annual basis.

- *Responsible Agency: Murrieta Housing Authority and Planning Division*
- *Timeframe: Ongoing, as projects are submitted to the Murrieta Planning Division*
- *Potential Funding Source: General Fund*
- *Objectives: The City will promote the program at City Hall, on its website and will evaluate requests for funding on a case by case basis. Monitor the program bi-annually.*

Action 1.7 – Housing for Extremely Low Income Families

The City shall apply for State and federal funds for direct support of low-income housing construction and rehabilitation. The Murrieta Housing Authority shall continue to monitor and access potential funding sources, when available, such as, but not limited to CDBG and HOME funds. The City shall also seek State and federal funding specifically targeted for the development of housing affordable to extremely low-income households, such as the Local Housing Trust Fund program, Proposition 1-C funds, Emergency Housing and Assistance Program (EHAP), Federal Emergency Shelter Grant Program (FESG), Housing Assistance Program (HAP) and the Multifamily Housing Program (MHP & MHP-SH). The City shall promote the benefits of this program to the development community by posting information on its web page and creating a handout to be distributed with land development applications.

- *Responsible Agency: Murrieta Housing Authority and Planning Division*
- *Timeframe: Ongoing, depending on funding available; promotional material will be prepared and utilized throughout the planning period.*
- *Potential Funding Source: General Fund*
- *Objectives: The City will promote the programs with funding available at City Hall, on its website and will evaluate requests from developers for funding on a case by case basis.*

Goal 2: Conserve and enhance the quality of existing housing and residential neighborhoods in Murrieta.

Continued maintenance and preservation of the existing housing stock in Murrieta is crucial to ensure quality neighborhoods. Housing programs focused on the achievement of this goal include rehabilitation of single- and multifamily housing units, code enforcement, and efforts to preserve assisted housing units at risk of converting to market-rate housing. Through code enforcement, neighborhood, and home improvement programs, the City is able to maintain the condition of existing housing units.

Policy 2.1: Using any available funds, continue and/or create programs to maintain or improve the character and quality of existing housing and neighborhood environments.

Policy 2.2: Assist in the preservation of all units "at-risk" of converting from affordable housing to market rate.

Policy 2.3: Encourage energy efficient design in existing and new residential units and promote sustainability upgrades in existing and proposed residential complexes.

Policy 2.4: Encourage property owners to maintain and make improvements to their properties by taking advantage of programs offered by the City and County.

Actions and Programs

Action 2.1 –Property Maintenance Enforcement

Enforce and expand where necessary, the property maintenance provisions embodied in the Uniform Building Code and the ~~Zoning Ordinance~~Development Code in order to conserve and improve the quality of the housing units in the City. The City's housing stock is generally in good condition as majority of the units were constructed during or after the 1980's. Consequently, potential code violations are identified by complaints reported to the City and are addressed by the City's police department and when appropriate Community Development staff. These efforts are intended to result in the continued maintenance of housing units throughout the City. If a property requires significant repairs or maintenance, code enforcement officials will inform property owners of any rehabilitation loans or grants provided through Riverside County that are be available to address such issues.

- *Responsible Agency: Development Services and Code Enforcement~~Murrieta Police Department and Code Enforcement~~*
- *Timeframe: Ongoing, 2014-2021*
- *Potential Funding Source: General Fund*
- *Objective: Maintain the quality of the existing housing stock by addressing code violations as they are reported. Refer eligible property owners to Riverside County programs if property maintenance funding is needed.*

Action 2.2 – Monitor Affordable Units

The City of Murrieta currently has five affordable housing complexes, three rental and two ownership developments, with 245 deed restricted units that do not expire until after 2050. To determine how effective the City's housing programs have been in the development and maintenance of affordable housing, the City will monitor these affordable units to ensure that the rent payments charged are consistent with levels appropriate for the identified income category. The City has posted their AB 987 Affordable Housing Database on its website and will continue to track affordable housing units citywide through the annual certification process. In addition, as the City develops additional affordable units these properties will be added to the table and will be monitored annually to ensure they meet affordability requirements.

- *Responsible Agency: Murrieta Housing Authority and Planning Division*
- *Timeframe: Ongoing 2014-2021*
- *Potential Funding Source: General Fund*
- *Objective: Maintain a list of affordable units throughout the City including affordability information to ensure property owners are compliant with deed restrictions and to preserve affordable units.*

Action 2.3– Purchase Housing Covenants

Existing housing units throughout the residential areas of the City are generally in good condition as most were constructed during or after the 1980's. When funding is available, the Murrieta Housing Authority plans to acquire 55 year affordability covenants on existing multifamily rental units, focusing on residences that may be in need of minor rehabilitation. –The Authority will target multifamily complexes with 4-16 units, located around or in the downtown area, but if necessary will also purchase covenants in developments anywhere in the City. The elimination of the City's Redevelopment Agency during the 2008-2014 planning period, has resulted in a loss of a permanent funding source for this program. Consequently, for the 2014-2021 planning period, the City will investigate new funding opportunities and administer funds as they become available. If and when a permanent funding source is identified, the City will provide information about the program at City Hall, on the City's website and in other public places to increase awareness.

- *Responsible Agency: Murrieta Housing Authority and Planning Division*
- *Timeframe: Ongoing 2014-2021*
- *Potential Funding Source: General Fund; Additional funding sources needed.*
- *Objective: Investigate new funding opportunities and administer funds as they become available. If, and when, a permanent funding source is identified, the City will provide information at City Hall, on the City's website and in other public places to increase awareness.*

Action 2.4 –Neighborhood Stabilization Program

The City of Murrieta does not currently have direct access to Neighborhood Stabilization Program funds; however they are able to support local organizations receiving funds through the County of Riverside. The City provides letters of support for participating organizations such as: Habitat for Humanity and the Housing Authority of Riverside to ensure that these organizations have funding to assist the City with foreclosure property rehabilitation and the resale of units to moderate and low-income homebuyers.

- *Responsible Agency: Murrieta Housing Authority*
- *Timeframe: Ongoing, 2014-2021*
- *Potential Funding Source: General Fund; Riverside County*
- *Objective: Support local organizations to ensure their continued ability to provide services to residents.*

Action 2.5– Energy Efficient Design

The City will review ordinances and recommend changes where necessary to encourage energy efficient housing design and practices that are consistent with state regulations. The City will periodically distribute literature or post information on their website regarding energy conservation, including solar power, energy efficient insulation, and subsidies available from utility companies, and encourage homeowners and landlords to incorporate these features into construction and remodeling projects. When possible the City will encourage energy conservation devices including, but not limited to lighting, water heater treatments, and solar energy systems for all residential projects. The Planning division will encourage maximum utilization of Federal, State, and local government programs, such as the County of Riverside Home Weatherization Program, that assist homeowners in providing energy conservation measures.

- *Responsible Agency: Murrieta Housing Authority and Planning Division*
- *Timeframe: Ongoing, 2014-2021*
- *Potential Funding Source: General Fund*
- *Objective: The City will promote the programs with funding available at City Hall, on its website and will periodically review ordinances and recommend changes where necessary to encourage energy efficient housing design and practices that are consistent with state regulations*

Action 2.6 – Riverside County Partnership Program

As a means of further leveraging housing assistance, the City will cooperate with the Riverside County Economic Development Agency (EDA) and Riverside County Housing Authority to promote resident awareness and application for County run housing assistance programs. These programs include:

- Home Repair Program,
- Senior Home Repair Program,
- Home Weatherization Program,
- First-time Home Buyer Down Payment Assistance Program, and

- Mortgage Credit Certificate Program.

The County offers a variety of housing assistance programs that can supplement the City's current housing programs. As the City has little control over how the County's programs are administered the City will be responsible for providing program information on the City's website and at City Hall.

- *Responsible Agency: Murrieta Housing Authority and Planning Division*
- *Timeframe: Ongoing, 2014-2021*
- *Potential Funding Source: General Fund*
- *Objective: Increase resident awareness about housing programs offered by the County by providing information at City Hall and on the City's website.*

Goal 3: Minimize the impact of governmental constraints on housing production and affordability.

Policy 3.1: Provide developer incentives, such as a density bonus or flexibility in development standards, to facilitate the development of quality housing that is affordable to lower and moderate-income households.

Policy 3.2: Periodically review and revise the City's development standards, if necessary, to facilitate quality housing that is affordable to all income levels.

Policy 3.3: When feasible, consider reducing, subsidizing, or deferring development fees and offering faster permitting time periods to facilitate the provision of affordable housing.

Policy 3.4: Support innovative public, private and non-profit partnership efforts for the development of affordable housing.

Policy 3.5: Encourage the development of rental units with three or more bedrooms to provide affordable housing for large families.

Actions and Programs

Action 3.1 – Density Bonus Ordinance

During the 2008-2014 planning period, the City of Murrieta revised their density bonus ordinance to be consistent with State law, which includes decreasing the number of affordable units a developer must provide to receive a density bonus and allowing up to three regulatory concessions. The revised ordinance is intended to facilitate the development of housing for low and very low-income households that is restricted for a period of no less than 45-55 years. The City will promote the use of the density bonus ordinance in conjunction with the TOD Overlay program, mixed-use projects, senior housing, and within Specific Plans. Information on the ordinance will be provided at City Hall and online at the City's website to promote the application of ordinance for the development of affordable units.

- *Responsible Agency: Murrieta Housing Authority and Planning Division*
- *Timeframe: Ongoing, 2014-2021*
- *Potential Funding Source: General Fund*
- *Objective: Provide information about such incentives at City Hall, on the City's website and in other public places to increase awareness. Encourage the construction of 10 additional units over the planning period.*

Action 3.2 – Permit Processing Time

Continue to implement permit streamlining, which includes monitoring the development plan review process to reduce any identified impediments to affordable housing. Additionally, the processing time of applications for new construction or rehabilitation of housing for lower and moderate-income households and seniors will be prioritized.

- *Responsible Agency: Murrieta Planning Division*
- *Timeframe: Ongoing, 2014-2021*
- *Potential Funding Source: General Fund*
- *Objective: Provide information about permit streamlining at City Hall, on the City's website and in other public places to increase awareness.*

Action 3.3 – Fee Subsidies for Extremely Low-Income Households

On a case by case basis, when funding is available, the City shall subsidize up to 100 percent of the application processing fees for developments in which five percent of units are affordable to extremely low-income households. To be eligible for this fee subsidy, the units shall be affordable by affordability covenant (no less than 45 years for owner-occupied units and not less than 55 years for rental units). The subsidy or reduction of fees may also be considered when an alternative funding source is identified to pay these fees. As the City had previously utilized redevelopment set-aside funds, this program is currently without a permanent funding source. For the 2014-2021 planning period the City will investigate new funding opportunities and administer funds as they become available. The City shall promote the benefits of this program to the development community by posting information on its web page and creating a handout to be distributed with land development applications.

- *Responsible Agency: Murrieta Housing Authority and Planning Division*
- *Timeframe: Ongoing, 2014-2021*
- *Potential Funding Source: General Fund; Additional funding sources needed.*
- *Objective: Provide information about fee subsidies for projects that include units affordable to ELI households at City Hall, on the City's website and in other public places, and by creating a handout to be distributed with land development applications.*

Action 3.4 – Incentives for Large Multifamily Units

It is crucial that affordable units constructed in the City are available for families as well as the other special needs groups; however, larger units are often more costly to develop. The City will provide incentives to developers to encourage the inclusion of units with three or more bedrooms to accommodate low-income large family households. Incentives may include utilizing the density bonus, fast track processing, fee reductions, waiving of specific development standards, etc. The City has previously developed affordable units with three bedrooms in Monte Vista and Monte Vista II. Individual projects will be evaluated to determine if they qualify for any incentives on a case by case basis.

- *Responsible Agency: Murrieta Housing Authority and Planning Division*

- *Timeframe: Ongoing, 2014-2021*
- *Potential Funding Source: General Fund; Additional funding sources needed.*
- *Objective: Aim to construct 16 multifamily rental units with three or more bedrooms in the planning period.*

Action 3.5 – Residential Development Standards

In conjunction with Action 1.1, City staff will specifically review the development standards for the residential zones to identify standards that may constrain the development of affordable housing and housing for special groups such as disabled individuals. Within the Housing Element there are several standards, such as lot coverage, parking requirements and minimum parcel size, which may in some instances be interpreted to be a constraint. While the City is flexible and is committed to working with developers to build affordable units, resulting in modifications to these standards, the City will further review these standards and alter them as necessary to ensure no constraints to affordable housing exist. In conjunction with the current Zoning Code update, Staff will also review requirements such as the minimum unit size, property line setbacks, parking requirements, height restrictions, etc. to ensure that they are necessary and pertinent. The City is committed to address any constraints identified in Chapter 6, Housing Constraints, during the General Plan update process. In the interim, staff will, on a case by case basis, identify ways that standards can be relaxed if it is determined that such requirements are in any way impeding the development of affordable housing or housing for disabled residents. The City will also continue to provide development standard modifications, fast track processing for applications related to the creation of affordable housing and will offer fee modifications for projects including affordable units that are required to apply for variations to the existing development standards.

- *Responsible Agency: Murrieta Planning Division*
- *Timeframe: The City will review development standards annually throughout the planning period to address any standards that may become a constraint to the development of affordable units.*
- *Potential Funding Source: General Fund*
- *Objectives: Review development standards to identify constraints and remove or offset constraints where possible.*

Action 3.6 – Second Unit Ordinance

The City recognizes that second units provide a unique opportunity to create affordable units in residential areas particularly for elderly residents. Consequently, during the 2008-2014 planning period, Staff reviewed and updated the second unit ordinance to comply with State law and to ensure that no constraints exist to the development of second units in the City. The City will administer their updated second unit ordinance and will promote the ordinance online and at City Hall.

- *Responsible Agency: Murrieta Planning Division*
- *Timeframe: Ongoing 2014-2021*
- *Potential Funding Source: General Fund*
- *Objective: Construct 5 units over the planning period*

Action 3.7 – Water and Sewer Service Providers

In accordance with Government Code Section 65589.7 as revised in 2005, immediately following City Council adoption, the City will deliver a copy of the 2014-2021 Housing Element to all public agencies or private entities that provide water or sewer services to properties within the City of Murrieta.

- *Responsible Agency: Murrieta Planning Division*
- *Timing of Implementation: By October 15, 2012*
- *Funding Source: General Fund*
- *Objective: Ensure that water and sewer providers are aware of the City's intentions for residential development throughout the City.*

Action 3.8 - Flood Management

In accordance with Government Code Section 65302, as part of the current General Plan update process the City reviewed and revised the Conservation and Safety Elements to consider flood risks as they relate to future land use decisions. The Conservation Element has been updated to identify rivers, creeks, streams, flood corridors, riparian habitats, and land that may accommodate floodwater for purposes of groundwater recharge and storm water management. Additionally, the Safety Element identifies information regarding flood hazards, including, but not limited to flood hazard zones, National Flood Insurance Program maps published by FEMA, information about flood hazards, designated floodway maps, dam failure inundation maps, areas subject to inundation in the event of the failure of levees or floodwalls, etc. as listed in Section 65302(g)(2) and establish a set of comprehensive goals, policies, and objectives for the protection of the community from the unreasonable risks of flooding. The City will continue to utilize information from the General Plan and consider flood risks in all future land use decisions.

- *Responsible Agency: Murrieta Planning Division*
- *Timing of Implementation: Ongoing 2014-2021*
- *Funding Source: General Fund*
- *Objective: Ensure that flood risks are considered when making land use decisions*

Goal 4: Promote equal housing opportunity for all residents.

To fully address the community's housing needs, the City must assure that housing is accessible to all residents, regardless of race, religion, family status, age, or physical disability. The City, through a partnership with Riverside County Economic Development Agency, refers residents with fair housing concerns to the Fair Housing Council.

Policy 4.1: Continue to enforce fair housing laws prohibiting discrimination in the building, financing, selling, or renting of housing on the basis of race, ethnicity, ancestry, national origin, religion, sex, disability, age, marital status, familial status, source of income, sexual orientation, or any other arbitrary factor.

Policy 4.2: Cooperate with the Riverside County Fair Housing Council in the enforcement of fair housing laws and in the review of violations of applicable Federal and State fair housing laws

Policy 4.3: Address households at-risk of foreclosure to prevent abandonment and limit the impact on neighborhoods.

Policy 4.4: Assess the social service needs of the community and provide a wide variety of social service programs to City residents.

Actions and Programs

Action 4.1 – Reasonable Accommodation

The purpose of this program is to ensure that sufficient provisions are provided by the City to facilitate a resident's request for "reasonable accommodation." This means that Murrieta will ensure that the established development requirements do not place an undue burden on disabled persons living or moving into the City. For example, a household with a handicapped family member may require modifications to the housing unit to accommodate that family member. These include the installation of wheel chair ramps (both interior and exterior), wider doorways, and installation of wheelchair elevators in units containing multiple-levels, and the installation of handrails and modified plumbing fixtures in bathrooms.

The City has currently adopted the Universal Design Standards and will develop further procedures for reasonable accommodation in accordance with fair housing and disability laws. During the 2008-2014 planning period, City amended the Municipal Code to provide for clear rules, policies, procedures, and fees for reasonable accommodation in order to promote equal access to housing. Policies and procedures clearly indicate the qualifying individuals who may request a reasonable accommodation (i.e., persons with disabilities, family-members, landlords, etc.) and specific procedures that must be followed. During the 2014-2021 planning period, City staff will focus on eliminating or modifying those land use, zoning, regulations, and fees that may constrain the housing needs of persons of disabilities. The City will provide information on the City website and at public counters to inform residents of the procedures for requesting reasonable accommodation.

- *Responsible Agency: Murrieta Planning Division*
- *Timeframe: Ongoing, 2014-2021*
- *Potential Funding Source: General Fund*
- *Objective: Provide information about reasonable accommodation at City Hall, on the City's website and in other public places to increase awareness.*

Action 4.2 – Fair Housing

The City will continue to receive fair housing services through the County of Riverside's program for participating cities. The City will ensure that information about the Fair Housing Council of Riverside County, Inc., and its programs is available to all City residents. As part of this program the City will also revise the definition of family in the Zoning Code to ensure compliance with federal and State housing laws. The definition shall not distinguish between related and unrelated persons and not impose numerical limitations on the number of persons that constitutes a family.

- *Responsible Agency: Murrieta Planning Division*
- *Timeframe: Ongoing, 2014-2021*
- *Potential Funding Source: Riverside County CDBG*
- *Objective: Cooperate as needed with the Fair Housing Council of Riverside County, Inc., to mediate housing issues involving Murrieta residents. Provide information about tenant and landlord housing rights at City Hall, on the City's website and in other public places to increase awareness.*

Action 4.3– Homeless Assistance Program

~~According to the most recent Point in Time homeless count, there are nineteen homeless individuals that have been identified in the City of Murrieta.~~ Three years ago, the City co-founded the Regional Homeless Alliance, a five-city collaborative that connects local governments, enforcement agencies, and nonprofit organizations. Through this collaboration, hundreds of homeless individuals and families have found resources to remain housed. The mission of the program is to further improve the quality of life by developing residents', businesses' and visitors' awareness, understanding, and participation in a comprehensive strategy to solve homelessness in Southwest Riverside County. This will be accomplished through outreach, housing navigation, encampment cleanups, and implementing a GIS mapping platform. Currently the City assists numerous local nonprofit organizations through the Riverside County CDBG program, including: Community Food Pantry of Murrieta, Boys and Girls Club of SW Riverside County, Michelle's Place, Safe Alternatives for Everyone (S.A.F.E.), Rose Again Foundation (foster youth), and the Assistance League of Temecula Valley. The City will continue to assist local organizations in applying for CDBG funding and other sources of funding (e.g., Homeless Emergency Aid Program) through the County, allowing them to provide irreplaceable services to extremely low-income families in the community.

- *Responsible Agency: Community Services Department and Police Department*
- *Timeframe: Ongoing 2014-2021*
- *Potential Funding Source: Riverside County CDBG and other potential sources of funding (e.g., HEAP)*

- *Objective: Monitor the number of homeless individuals in the City and provide referrals to the appropriate organizations. Also provide information about tenant and landlord housing rights at City Hall, on the City's website and in other public places to increase awareness.*

~~According to the Riverside County Homeless Count and Survey conducted in 2011, there are approximately 2 homeless individuals that have been identified in the City of Murrieta. The City will continue to assist local nonprofit organizations that have expertise in assisting homeless persons and families in applying for funding from the Riverside County CDBG program. Currently, organizations apply to the City and the City is responsible for reviewing applications and recommending specific organizations receive funding. Organizations that have received funding in the past include: St. Martha's Catholic Church, Single Mom's Life Skills Program, the Boys and Girls Club - S.W. County, Domestic Violence Services, Community Food Pantry of Murrieta, the Women's Health Assistance Program, and the Inclement Weather Voucher Program through the Temecula/Murrieta Rescue Mission. The City will continue to assist local organizations in applying for CDBG funding and other sources of funding (e.g., No Place Like Home) through the County, allowing them to provide irreplaceable services to extremely low-income families in the community.~~

- ~~*Responsible Agency: Murrieta Housing Authority and Police Department*~~
- ~~*Timeframe: Ongoing 2014-2021*~~
- ~~*Potential Funding Source: Riverside County CDBG and other potential sources of funding (e.g., No Place Like Home)*~~
- ~~*Objective: Monitor the number of homeless individuals in the City and provide referrals to the appropriate organizations. Also provide information about tenant and landlord housing rights at City Hall, on the City's website and in other public places to increase awareness.*~~

Action 4.4 – Foreclosure Prevention Program

Like most southern California communities, during the previous planning period Murrieta experienced an increase in foreclosures in the community. While the number of households at risk of foreclosure has decreased, there are still a number of households that can benefit from foreclosure counseling services. The City currently partners with the Fair Housing Council of Riverside County to provide foreclosure prevention counseling and mediation services to homeowners who are experiencing financial hardship and mortgage delinquencies. In 2009, the City enacted two ordinances requiring homeowners to register abandoned properties and allowing the City to assess higher penalties for property maintenance violations. In addition to the City's efforts, a foreclosure hotline established by the Homeownership Preservation Foundation is available to assist homeowners in the early stages of the process and a citizen group has been established to maintain the exterior appearance of abandoned residences in the community. Information on foreclosure assistance is available at City Hall and on the City's website. The City's partnership with the County has also led to discussions of how CDBG funds may be used to create additional services to prevent additional foreclosures.

- *Responsible Agency: Murrieta Housing Authority and Planning Division*
- *Timeframe: Ongoing, 2014-2021*
- *Potential Funding Source: General Fund*
- *Objective: Provide information on the City's website, at City Hall and in other public places regarding organizations and programs that address how to prevent and address foreclosure if it does occur.*

Action 4.5 – Housing for Developmentally Disabled Persons Program

The housing needs of persons with disabilities, including persons with developmental disabilities are typically not addressed by Title 24 Regulations. The housing needs of persons with disabilities, in addition to basic affordability, range from slightly modifying existing units to requiring a varying range of supportive housing facilities. To accommodate residents with developmental disabilities the City will seek State and Federal monies, as funding becomes available, in support of housing construction and rehabilitation targeted for persons with disabilities, including developmental disabilities. Murrieta will also provide regulatory incentives, such as expedited permit processing and fee waivers and deferrals, to projects targeted for persons with disabilities, including persons with developmental disabilities. To further facilitate the development of units to accommodate persons with developmental disabilities, the City shall reach out annually to developers of supportive housing to encourage development of projects targeted for special needs groups. Finally, as housing is developed or identified, Murrieta will work with the Inland Regional Center to implement an outreach program informing families within the City of housing and services available for persons with developmental disabilities. Information will be made available on the City's website.

- *Responsible Agency: Murrieta Housing Authority and Planning Division*
- *Timeframe: Ongoing, 2014-2021*
- *Potential Funding Source: General Fund*
- *Objective: The City will: continue to offer specific regulatory incentives throughout the planning period, when funding is available, apply for funding at least twice during the planning period to encourage development of unit specifically for persons with disabilities, will reach out annually to developers; and will initiate a cooperative outreach program with the Regional Center by 2014.*

Goal 5: Identify adequate sites to achieve housing variety.

Meeting the housing needs of all residents of the community requires the identification of adequate sites for all types of housing. By capitalizing on the allowances in the Development Code and continuing to maintain an inventory of potential sites, the City will assure that adequate residentially-zoned and mixed-use sites are available.

Policy 5.1: Identify vacant and/or underutilized parcels, throughout the City, that can accommodate a variety of housing types for all socioeconomic segments of the community.

Policy 5.2: Support the construction of new affordable housing by rezoning vacant and underdeveloped parcels to allow for higher density development.

Policy 5.3: Allow for and encourage the provision of emergency shelters and temporary housing.

Policy 5.4: Maintain zoning regulations that permit by right, in designated zones, housing that meets temporary and short-term housing needs for individuals and families.

Policy 5.5: Require that housing constructed expressly for low- and moderate-income households not be concentrated in any single portion of the City.

Actions and Programs

Action 5.1 – Ensure Adequate Sites to Accommodate Allocated Regional Housing Growth

To facilitate and encourage the development of affordable and market rate housing, the City of Murrieta has provided an inventory of housing opportunity sites that are appropriate to accommodate their RHNA allocation. As shown in Housing Resources section, the City is more than able to accommodate their 2014-2021 RHNA allocation of 1,573 units. Based on the permitted densities, vacant land zoned SF-1 and SF-2 and MU-3 can accommodate the City's above-moderate income RHNA allocation of 627 units. Similarly, vacant land zoned MF-2 can accommodate the City's moderate income RHNA allocation of 289 units. To accommodate their lower income RHNA, including the very low and low income allocations, totaling 657, the City has identified two opportunity sites that are zoned MF-3, permitting densities up to 30 dwelling units per acre. These two sites can accommodate approximately 242 units. Finally, the City has identified the TOD Overlay Program area, with permitted densities at 30 dwelling units per acre, to accommodate their remaining lower income RHNA allocation. The Program area can accommodate approximately 2,340 units. To ensure that developers and residents are aware of development opportunities the City will provide information on housing opportunity sites identified in the Housing Element and any additional areas of the City.

The City will report on the progress of development on these sites in its annual progress reports required pursuant to Government Code Section 65400 and due on April 1st of each year.

- *Responsible Agency: Murrieta Housing Authority and Planning Division*
- *Timeframe: Annual reports will be prepared throughout the planning period.*
- *Funding Source: General Fund*

- *Objectives: Continue to provide appropriate land use designations and maintain an inventory of suitable sites for residential development. Make the vacant and underutilized residential sites inventory available on the City's website to non-profit and for-profit housing developers.*

Action 5.2 – Provide Emergency and Transitional Housing

Extremely low-income households and households with special needs have limited housing options in Murrieta. Housing types appropriate for these groups include: emergency shelters, transitional housing, supportive housing, and single-room occupancy (SRO) units. To accommodate this population group the City amended the ~~Zoning~~ Development Code to define transitional and supportive housing as residential use, and considered subject only to those restrictions that apply to other residential uses in that same zone. The City also revised the Zoning Code to permit emergency shelters by right without a Conditional Use Permit or other discretionary action in the Business Park (BP) zone and will ensure that a proposed shelter is subject to only the development standards as permitted by State law. These zones are appropriate to accommodate emergency shelters as they are typically located along major arterial roadways with access to employment centers and near stores and other services. There are currently 376 acres of vacant land zoned BP, including sites between 2 and 5 acres, in size that are appropriate and able to accommodate a shelter of approximately 20 beds if one is proposed. It is estimated that there are approximately 17 sites zoned Business Park between 2 and 5 acres in size, which is more than sufficient to accommodate at least one emergency shelter.

The City will continue to monitor the inventory of sites appropriate to accommodate emergency and transitional housing and will work with the appropriate organizations to ensure the needs of homeless and extremely low income residents are met. The City is committed to prioritizing funding and other available incentives for projects that provide housing for extremely low income residents whenever possible. Additionally, as mentioned in Action 4.3, the City also partners with homeless assistance service providers and will continue to do so throughout the planning period.

- *Responsible Agency: Murrieta Planning Division*
- *Timeframe: Ongoing, 2014-2021*
- *Potential Funding Source: General Fund*
- *Objectives: Ensure that the housing need of all residents is met by providing opportunities for transitional housing, emergency shelters and SRO units to be accommodated within the City. Prioritize available incentives for extremely low income households.*

Table 2-1: Summary Housing Plan

	Housing Program	Responsible Agency	Funding Source & Amount	Time Frame	Overall Objective
Goal 1: Provide adequate housing opportunities throughout the City.					
1.1	General Plan Review	Planning Divison	GF	2014-2021	Review GP and ZC for consistency
1.2	First Time Homebuyer Program	Housing Authority	GF, New source needed	2014-2021	Case by case basis, when funds available
1.3	Land/Property Acquisition Program	Planning/Housing Authority	HOME, New source needed	2014-2021	Investigate new funding source
1.4	Lot Consolidation Program	Planning Divison	GF	2014-2021	Provide Information; Case by case basis
1.5	Large Site Program	Planning Divison	GF	2014-2021	Provide Information; Case by case basis
1.6	Housing for ELI Households	Housing Authority	GF, New source needed	2014-2021	Provide Information; Case by case basis
Goal 2: Conserve and improve the existing affordable housing stock.					
2.1	Property Maintenance Enforcement	Police Dept	GF	2014-2021	Address complaints as necessary
2.2	Monitor Affordable Units	Housing Authority	GF, New source needed	2014-2021	Continue to maintain AB 987 table
2.3	Purchase Land Covenants	Planning/Housing Authority	GF, New source needed	2014-2021	Investigate new funding source
2.4	Neighborhood Stabilization Program	Planning/Housing Authority	GF, Riverside Co.	2014-2021	Support organizations receiving funds
2.5	Energy Effiecient Design	Planning/Housing Authority	GF	2014-2021	Encourage efficient design in projects
2.6	Riverside County Partnership	Housing Authority	GF	2014-2021	Provide information
Goal 3: Removal of constraints to new affordable housing construction.					
3.1	Density Bonus Ordinance	Planning/Housing Authority	GF	Ongoing	Provide 10 units/planning period
3.2	Permit Processing Time	Planning	GF, Case by Case Basis	Ongoing	Provide information
3.3	Fee Subsidies for ELI Households	Planning/Housing Authority	GF, New source needed	Ongoing	Provide information
3.4	Incentives for Large Multi-Family Units	Planning/Housing Authority	GF, New source needed	Ongoing	Provide 16 units/planning period
3.5	Residential Development Standards	Planning	GF	Ongoing	Address contraints identified in Chapter 6
3.6	Second Unit Ordinance	Planning	GF	Ongoing	Provide 5 units/planning period
3.7	Water & Sewer Providers	Planning	GF	10/1/2014	Provide final draft to providers
3.8	Flood Managenent	Planning	GF	Ongoing	Consider flood risks with new development
Goal 4: Promote equal housing opportunity for all residents.					
4.1	Reasonable Accommodation	Planning	GF	Ongoing	Provide information
4.2	Fair Housing	Planning/Housing Authority	CDBG	Ongoing	Case by Case basis
4.3	Homeless Assistance Program	Housing Authority/Police	GF, CDBG	Ongoing	Assist organizations applying for funding
4.4	Foreclosure Prevention Program	Planning/Housing Authority	GF, Fair Housing Council	Ongoing	Provide information
Goal 5: Identify adequate sites to achieve housing variety.					
5.1	Adequate Sites to Meet the RHNA	Planning/Housing Authority	GF	Ongoing	Accommodate allocated RHNA units
5.2	Emergency & Transitional Housing	Planning/Housing Authority	GF	Ongoing	Monitor sites

Notes: 1. All funding amounts provided are approximate.

2. HH = households, RDA = Redevelopment Agency, RDAs = Redevelopment Set Aside Funds, GF = General Fund, pp = planning period, ZC = Zoning Code,

* The total combined funding for these three programs will not exceed $300,000 annually.

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Quantified Objectives

Section 3

California Housing Element Law requires jurisdictions to estimate the number of affordable housing opportunities that will be created over the planning period. The quantified objectives for the 2014-2021 Housing Element presents the anticipated and potential affordable housing development for the planning period starting on January 1, 2014 and ending September 30, 2021.

It is important to note that while the goal of the quantified objective section is to show how the City will meet its remaining RHNA allocation, and based on the premise that the City intends to make every effort to achieve these goals, Murrieta cannot guarantee that these needs will be met given limited financial and staff resources, and the increasing gap in affordability of housing resources and incomes. Satisfaction of the City's regional housing needs will partially depend on the cooperation of private funding sources and resources of the State, Federal and County programs that are used to support the needs of the extremely low-, very low--, low-, and moderate-income households. Additionally, outside economic forces heavily influence the housing market. State law recognizes that a locality may not be able to accommodate its regional fair share housing need.

Table 3-1 presents the City's quantified objectives in three categories: construction of new affordable units, program assistance and the conservation of affordable housing. New affordable units are broken down into two sub categories: city assisted developments and units accommodated in the Transit Oriented Development (TOD) Overlay Program area. The first subcategory references three parcels (Sites One and Two, in the land inventory), that were purchased by the City the purpose of developing affordable housing units. These sites are available to accommodate the extremely low, very low and low income RHNA allocations. The second subcategory shows the City's efforts to accommodate its 2014-2021 RHNA allocation on parcels that are vacant and residentially zoned or are within the TOD Overlay Program area as described in Section 7.4. It is important to note that this subcategory assumes optimum conditions for the production of housing and does not take into account how environmental, physical and market conditions influences the timing, type and cost of housing production in a community. The parcels with densities appropriate to accommodate multifamily housing and affordable units are shown in Tables A-1, A-2, A-3, A-4, A-5, and A-7.

In addition to new construction, the City anticipates that approximately 15 units will be assisted through programs, such as the City's Density Bonus and Second Unit Development ordinances, as outlined in Section 2, *Housing Plan.* Table 3-1, also shows third category, to show the City's efforts to purchase covenants on units to preserve their affordability; however with the elimination of the Murrieta Redevelopment Agency there is not a dedicated funding source for the conversation or preservation of affordable units. At the start of the planning period the City cannot predict or plan for the conservation of units, without an appropriate funding source; however the City will continue to investigate new funding opportunities and will pursue this objective when financially feasible.

In total, the City anticipates that 242 lower income units will be accommodated on City owned land, 15 units will be assisted by City administered programs, and 3,983 units (excluding the City owned sites) will be accommodated on vacant residentially zoned sites and underutilized land within the TOD Overlay Program area. Table 3-1 provides an estimate quantified objectives for the number of housing units, broken down by income category, over the 2014-2021 timeframe.

Table 3-1: Quantified Objectives 2014-2021

	Income Category					Total
	Extremely Low	Very Low[c]	Low	Moderate	Above Moderate	
New Affordable Units						
City Assisted Developments[a]	60	61	121	--	--	**242**
Units Accommodated by Vacant Sites and the TOD Overlay Program [b]	585	585	1,170	438	1,205	**3,983**
Program Assistance						
Density Bonus Ordinance	2	3	5	--	--	**10**
Second Unit Ordinance	--	--	5	--	--	**5**
Conservation/Preservation						
Purchase Covenants[d]	0	0	0	--	--	**0**
Total	**647**	**649**	**1,301**	**5**	**371**	**4,240**

Notes:
(a) This objective represents construction that has been proposed by the City of Murrieta on City owned land (Sites One and Two, in Section 7, *Housing Resources*) that will realistically be developed during the planning period. These sites are shown in Table A-6.
(b) This objective represents the City's construction capacity based on the vacant sites identified in Tables A-1, A-2, A-3, A-4, and A-5 and on the vacant and underutilized sites within the TOD Overlay Program area (Table A-7). Construction on these parcels assumes optimum conditions for the production of housing and does not consider constraints that are outside of the City's control (i.e. financial and market constraints).
(c) In accordance with State law, the City has determined that approximately fifty percent of its very low-income units (664 units) are designated to accommodate the need of extremely low-income households.
(d) With the elimination of the Redevelopment Agency there is not a dedicated funding source for the conversation or preservation of affordable units. The City will continue to investigate new funding opportunities and will pursue this objective when financially feasible. The City does have a number of deed restricted units in the City; however none are at-risk during the planning period.

Community Profile

Section 4

Introduction

The housing needs of the City are determined by the demographic characteristics of the population (age, household size, employment, income levels), the characteristics of its housing (number of units, age of units, tenure, size, cost), and the nature or type of community (suburban, industrial, agricultural, resort/tourism, high tech, schools, parks, transportation). The local housing market is seldom static, and is constantly changing based on dynamic social and economic factors. As City demographics and household socio-economic conditions change, different housing opportunities arise and/or must be created to meet demand. This section explores the characteristics of the existing and projected demographics and housing stock in order to define the extent of unmet housing needs in Murrieta. This information is critical in providing direction to update the City's Housing Element goals, policies, programs, and actions.

Housing Assistance Summary

Several factors will influence the degree of demand, or "need," for new housing in Murrieta in coming years. The four major needs categories considered in this Element include:

- Housing needs resulting from population growth in the City and the surrounding region;
- Housing needs resulting from the overcrowding of units;
- Housing needs that result when households pay more than they can afford for housing; and
- Housing needs of "special needs groups" such as elderly, large families, female-headed households, households with a disabled person, farm workers, and the homeless.

In identifying specific housing needs within the City, it appears that assistance for first-time homebuyers will continue to be critical for the low- and moderate-income households. Lower income groups will need the most assistance in meeting the higher cost burdens associated with owning a home. Although, new homes are for the most part, above the financial attainment of lower income households, there are homeownership opportunities for moderate-income households with the City's existing stock of older resale homes. In terms of rental households, there appears to be a need for additional rental resources with three or more bedrooms at rates affordable to lower income households.

Table 4-1 below summarizes the housing assistance needs of all households (categorized by income percentage of the Riverside County Area Median Income) in Murrieta by household tenure (renter/owner), household type (elderly, small/large families, other), and "housing problems." This count of households with "housing problems" includes those who: 1) occupy units with physical defects, such as lacking complete kitchen or bathroom; 2) live in overcrowded conditions (housing units with more than one person per room); 3) have a housing cost burden exceeding 30% of gross income; or 4) have a severe housing cost burden exceeding 50% of gross income.

Table 4-1: Housing Assistance Needs of Income Groups by Tenure

Household by Type, Income & Housing Problem	Total Renters	Total Owners	Total Households
Extremely Low-Income (0-30% MFI)	**465**	**860**	**1,325**
Number with any housing problems	*420*	*730*	*1,150*
Number with cost burden > 30%	*420*	*730*	*1,150*
Number with cost burden > 50%	*420*	*705*	*1,125*
Very Low-Income (31-50% MFI)	**925**	**1,040**	**1,965**
Number with any housing problems	*915*	*765*	*1,680*
Number with cost burden > 30%	*915*	*765*	*1,680*
Number with cost burden > 50%	*840*	*625*	*1,465*
Low-Income (51-80% MFI)	**1,350**	**2,605**	**3,955**
Number with any housing problems	*1,165*	*1,615*	*2,780*
Number with cost burden > 30%	*1,165*	*1,540*	*2,705*
Number with cost burden > 50%	*365*	*1,170*	*1,535*
Moderate-Income (81% + MFI)	**3,890**	**17,850**	**21,740**
Number with any housing problems	*1,245*	*7,810*	*9,055*
Number with cost burden > 30%	*1,045*	*7,670*	*8,715*
Number with cost burden > 50%	*0*	*1,785*	*1,785*
Total Households	**6,630**	**22,355**	**28,985**
Number with any housing problems	*3,745*	*10,920*	*14,665*
Number with cost burden > 30%	*3,545*	*10,705*	*14,250*
Number with cost burden > 50%	*1,625*	*4,285*	*5,910*

Source: HUD Comprehensive Housing Affordability Strategy (CHAS) Databook, 2005-2009.

According to the Comprehensive Housing Affordability Strategy Databook, nearly 51 percent of all households in the City of Murrieta experienced some form of housing problem. The percentage of households that experienced some type of housing problem was greater among renters (56 percent) than owners (49 percent) within all income categories. As shown in Table 4-1, housing cost burden is significant contributing factor to housing problems in the City.

Data Sources

The sources used in this needs assessment include the 2000 and 2010 U.S. Census, California Department of Finance (DOF) 2012 Population and Housing Estimates, the Census Bureau 2009-2011 American Community Survey (ACS), and various other sources. For demographic data, estimates are used to show changes in conditions since the 2010 U.S. Census. Many of these estimates (such as data from the Department of Finance and American Community Survey) are shown solely as percentages, as the raw numbers carry a significant margin of error, especially for smaller jurisdictions such as counties or cities. Nonetheless, the percentages presented give a general indication of population and employment trends.

Additional information has been drawn from the Comprehensive Housing Affordability Strategy (CHAS), which is drawn from 2010 Census data. Comprehensive Housing Affordability Strategy data is based on special tabulations for the U.S. Department of Housing and Urban Development (HUD) from sample Census data. Thus, the number of households in each category often deviates slightly from the 100% count due to extrapolations to the total household level. Because of this, interpretations of Comprehensive Housing Affordability Strategy data should focus on proportions and percentages, rather than on precise numbers.

4.1 - Population Trends and Characteristics

4.1.1 - Growth

The City of Murrieta was incorporated July 1, 1991 and encompasses 33.6 square miles. Since 2000, the City of Murrieta has been recognized as one of the fastest growing housing markets in western Riverside County. The 2010 Census estimated the population of Murrieta to be 103,466; this is a significant increase from the 2000 Census population of 44,282. Based on Census data, from 2000 to 2010, Murrieta grew at a faster rate (134 percent) than nearby Temecula (73 percent) and Riverside County (42 percent). Murrieta's growth can be attributed to many factors, including an increased supply of affordable housing when compared to higher prices in other nearby housing markets such as those in Los Angeles, Orange and San Diego Counties, but also the 2002 annexation of the 3,200 acres Hot Springs area, including approximately 12,000 residents. From 2006 to 2010, Murrieta grew from an estimated 92,933 to 103,466, or roughly 11 percent.

Table 4-2: Regional Population Growth Comparisons

Area	2000	2010	Numeric Increase	Percentage Increase
Murrieta	44,282	103,466	59,184	134%
Temecula	57,716	100,097	42,381	73%
Riverside County	1,545,387	2,189,641	644,254	42%

Source: 2000 Census; 2010 Census.

4.1.2 - Age of Population

According to the 2009-2011 American Community Survey, the median age in Murrieta is 33.4 years old. The largest segments of the City's population is the 35-64 age bracket (38 percent) and the under the age of 19 bracket (36 percent). The young adult (20-34) and senior populations (over 65) make up the remaining 30 percent of the population. Age plays an important role in determining housing needs. For example, younger families require more affordable housing as they begin their careers as do the elderly who require affordable units due to their age and retirement status as compared to adults that are established in the work force.

Table 4-3: Population by Age

Age Group	2000		2010	
	Number	Percentage	Number	Percent
Under age 19	31,112	34.0%	34,846	33.7%
20-34 years	19,065	20.8%	18,851	18.2%
35-64 years	32,804	35.9%	39,364	38.0%
Age 65 or older	8,538	9.3%	10,405	10.1%
Total	***91,519***	***100%***	***103,466***	***100%***

Source: 2005-2007American Community Survey; 2010 Census.

4.1.3 - Race

The racial majority in Murrieta is White, comprising approximately 70 percent of the population according to the 2010 Census. Asians make up just over 9 percent of the population, while the Black population accounts for roughly 5 percent. Approximately 16 percent of the population classified themselves as "Other".[1] Of the total percentage of residents, in 2010, approximately 26 percent of the population consider themselves to be ethnically, Hispanic.

Table 4-4: Population by Race

Race	2007 Percent of Population	2010 Percent of Population
White	75.4%	69.7%
Asian	10.4%	9.2%
Black	6.7%	5.4%
Other	7.5%	15.7%
Total	***100%***	***100%***
Hispanic[1]	23.3%	25.9%

Source: 2005-2007 American Community Survey; 2010 Census.

[1] Those reporting that they are of Hispanic origin may be of any race and are, therefore, included in one of the race categories.

4.1.4 - Employment Characteristics

Murrieta residents are employed in a diverse number of industries, with the largest percentage (21 percent) of the population employed in the Health and Education Service sector. In 2007 and 2010, the second most common sector of work was the Retail Trade, with 14 percent of the population employed in related jobs. In 2007, the third highest sector was construction, however with the economic downtown of 2008, this sector declined significantly by 4.6 percent by 2010. The retail sector is important to consider when assessing housing affordability as salaries tend to be lower, which decreases the amount of income available for housing. Generally, the retail sector does not offer health and other employment benefits, further increasing economic strain.

[1] The term "Other" refers to the races of American Indian and Alaska Native, Native Hawaiian and Other Pacific Islander, some other race, and two or more races.

Table 4-5: Employment by Sector

Employment Sector	2007 Percentage of Total Employment	2010 Percentage of Total Employment
Health, Education & Social Services	17.5%	21.3%
Retail Trade	13.6%	14.0%
Construction	10.8%	6.2%
Entertainment	10.3%	12.2%
Manufacturing	10.2%	9.9%
Management	8.6%	10.2%
Finance	8.5%	5.7%
Public Administration	5.5%	6.4%
Other Services	4.4%	4.4%
Transportation	3.9%	4.5%
Wholesale Trade	3.6%	2.9%
Information	2.4%	2.0%
Agriculture	0.7%	0.3%
TOTAL	***100%***	***100%***

Source: 2005-2007 American Community Survey; 2010 Census.

As of February 2012, the largest non-retail employer in the City is the Murrieta Valley Unified School District (1,919 employees). The second and third largest employers are Southwest Healthcare (800 employees) and the County of Riverside (662 employees). An analysis of employment data indicates that the vast majority of Murrieta's households have one or two wage earners who commute to jobs outside the City, while the jobs provided within the jurisdiction tend to be in the lower-paying service, retail trade and manufacturing sectors. In Riverside County, unemployment rates were estimated at 15.5 percent by the 2009-2011 American Community Survey, while unemployment in Murrieta is significantly lower at 8.3 percent.

4.2 - Household Characteristics

A household is defined by the Census as all persons occupying a housing unit. Families are a subset of households and include all persons living together who are related by blood, marriage or adoption. Single households include persons living alone in housing units, but do not include persons in group quarters such as convalescent homes, dormitories, or rehabilitation facilities. Other households are unrelated people living together, such as roommates.

The 2010 Census estimated the number of households in 2010 has increased to 35,294, a 137 percent increase over the 2000 Census estimate of 14,921. The Riverside County Center for Demographic Research projections suggests further growth, with a forecast growth of 39,705 households by 2020.[2]

In 2010, the Census estimated that the City of Murrieta had 32,749 households. Out of this total, 79 percent (26,577 households) were family households and 21 percent (6,716 households) were

[2] Riverside County Center for Demographic Research

non-family households. Table 4-6 provides detailed information on the demographics of the family and non-family households.

Table 4-6: Household Types

Type of Households	2007 Total Population	2010 Total Population
Families	***22,002***	***26,033***
Married Couples	18,258	20,577
Male-headed Households	1,622	1,642
Female-headed Households	2,122	3,814
Non-Families	***6,836***	***6,716***
Singles	5,446	5,208
Other	1,390	1,508
Total Households	***28,838***	***32,749***

Source: 2005-2007 American Community Survey; 2010 Census.

4.2.1 - Household Type

Household composition and size are often two interrelated factors. Communities containing a large number of families with children tend to have a larger average household size. Such communities have a greater need for larger units with adequate open space and recreational opportunities for children. The household size in Murrieta is an average of 3.15 persons per household, a slight increase from 2.9 reported in 2007. The County average household size by comparison was virtually the same at 3.14 persons per household, according to the 2010 US Census.

4.2.2 - Tenure

Tenure in the housing industry typically refers to the occupancy of a housing unit based on whether the unit is owner-occupied or renter-occupied. Tenure preferences are primarily related to household income, composition, and age of the householder. The tenure distribution of a community's housing stock influences several aspects of the local housing market. Residential mobility is influenced by tenure with ownership housing showing a lower turnover rate than rental housing.

According to the 2010 Census, the City had a total of 32,749 occupied housing units out of which 23,110 (71 percent) were owner-occupied and 9,639 (29 percent) were renter-occupied. Since 2000, the total of occupied housing units increased 102 percent from 11,407 owner-occupied units to 23,110 owner-occupied units. Likewise, renter-occupied housing units have increased 2,913 units in 2000 to 9,639 units in 2010, an increase of 231 percent.

Typically, multifamily units allow a community to meet a wider range of affordable housing needs. Murrieta offers programs to increase the housing options available for lower income families. The City has a number of programs that are designed to increase the number of affordable housing units in the City and to maintain the existing affordable housing stock, while still staying within the parameters of the goals of the Land Use Element.

4.2.3 - Household Income

The Census Bureau defines household and family incomes differently. Household income is defined as any income earners within a residence combining their income, while family income is defined as households with two or more persons related through blood, marriage or adoption combining their income. The 2009-2011 American Community Survey indicates that the City experiences higher household and family median incomes of $76,376 and $85,050 respectively, than the 2011 Riverside County medians of $55,729 and $62,381.

Table 4-7: Income Distribution

Annual Income Ranges	2007 Percent of Households	2010 Percent of Households
Less than $10,000	2.2%	2.9%
$10,000-$14,999	3.7%	2.1%
$15,000-$24,999	5.4%	7.0%
$25,000-$34,999	7.8%	7.6%
$35,000-$49,999	13.2%	12.4%
$50,000-$74,999	17.8%	16.8%
$75,000-$99,999	16.7%	17.6%
$100,000-$149,999	21.7%	20.4%
$150,000-$199,999	6.9%	7.4%
$200,000 or more	4.5%	5.8%
Total	***100%***	***100%***

Source: 2005-2007 American Community Survey; 2009-2011 American Community Survey 3-Year Estimates.

Typically, payment assistance is needed from local, State, or Federal government agencies to assist lower-income households in securing adequate housing because lower income households require housing with rents or payments lower than market rates. The City will continue to utilize available programs administered through the County (Mortgage Credit Certificate Program, Home Repair Program, First-time Homebuyer Program) and in conjunction with non-profit organizations (Habitat for Humanity) to provide residents with affordable housing. The City will also continue to utilize Federal Programs (Community Development Block Grant, HUD 202 Grant, and Section 8) and State Programs (Home Mortgage Purchase Program, Low-Income Housing Tax Credits) to further implement affordable housing in the City.

4.3 - Housing Stock Characteristics

Before current housing problems can be fully identified and future needs anticipated housing occupancy characteristics need to be examined within the City. The following is an analysis of household type, age of housing stock, and other housing stock characteristics that may affect access to and demand for housing and housing programs.

The Census Bureau defines a housing unit as a house, an apartment, a mobile home, a group of rooms, or a single room that is occupied (or, if vacant, is intended for occupancy) as separate living quarters. Separate living quarters are those in which the occupants live separately from any other individuals in the building and which have direct access from outside the building or through a common hall.

According to the 2009-2011 American Community Survey estimates, the City of Murrieta had 34,412 housing units. Between 2000 and 2010, the total amount of housing units increased by 19,487 units, or 131 percent. In 2010 the majority of housing units in Murrieta were single-family detached units (76 percent). Out of the total units that were constructed between 2000 and 2010, majority, (96 percent or 18,725 units) were single-family detached units.

Table 4-8: Housing Type

Housing Type	2000		2011	
	No. of Units	Percentage of Total	No. of Units	Percentage of Total
Single-Family				
Detached	12,505	83.8%	31,230	75.5%
Attached	211	1.4%	3,182	2.7%
Multifamily				
2-4 Units	147	1.0%	900	2.6%
5+ Units	1,522	10.2%	4,970	14.5%
Mobile Homes	540	3.6%	1,609	0.5%
Total Housing Units	***14,925***	***100%***	***34,412***	***100%***
Total Vacant Units	601	4.0%	3,182	9.2%

Source: 2005-2007 American Community Survey; 2009-2011 American Community Survey 3-Year Estimates.

In addition to single-family detached homes, multifamily developments with 5 or more units make up almost 15 percent of the total housing units in Murrieta while complexes with 2 to 4 units are only 2.6 percent of the total. Finally, mobile home units, typically classified separately from single-family detached units, round out the City's housing stock with 0.5 percent of total units in the City. Between 2000 and 2010, an additional 4,201 multifamily units of varying affordability levels were constructed.

4.3.1 - Vacancy Rate

The vacancy rate of a community's housing supply is a key indicator or whether an appropriate number of units are available in the City. If the vacancy rate is too high, this can have negative impacts on the community and the investment potential of a neighborhood. If the vacancy rate is too low, it may indicate that there are not enough units for any one income category to meet existing market demands, and that a portion of the population may be denied housing opportunities. The State Department of Housing and Community Development has determined that the "healthy" vacancy rate for ownership is between 2 percent and 3 percent and 5 percent to 6 percent for rental complexes. This ensures the continued upkeep of rental properties and keeps housing costs down.

The 2011 American Community Survey reported that the vacancy rate for ownership housing in the City was 2.7 percent while the rate for rental units was 7.9 percent. The vacancy rate for ownership housing is considered to be healthy based on the range recommended by HCD, while the rental housing vacancy rate is slightly higher than the target rate. These percentages suggest that there is a slight surplus of rental housing units in the City. This may be related to a high turnover of rental units as residents' transition from rental to ownership housing in the City.

4.3.2 - Condition of Housing Stock

Age is one measure of housing stock condition and a factor for determining rehabilitation or replacement need within the City. Without proper maintenance, housing units deteriorate over time. Units that are older are more likely to be in need of repairs (e.g. a new roof or plumbing). In general, houses 40 years or older are considered aged and are more likely to generate major repairs. In addition, older homes may not be built to current housing standards for fire and earthquake safety. The units of general concern are those that were constructed prior to 1969.

Majority of the City's current housing stock (93 percent) was constructed after 1980. The 2005-2007 ACS showed that Murrieta has only 238 units that were constructed prior to 1959, or 0.7 percent of the total housing stock. Table 4-9 provides information on the number of units constructed by decade. In addition to age, a lack in infrastructure and utilities often serves as an indicator of substandard conditions. According to the 2011 ACS, there were only 203 units lacking complete plumbing facilities, and 290 units lacking complete kitchen facilities in the City. Due to the low number of units built prior to 1959 and low number of units lacking utilities, the housing stock in the City is less likely in need of major repair.

The City provides resources through the County of Riverside for the rehabilitation of housing units for lower income households; however the City does not provide direct funding for this program. The City offers information about the rehab program on their website, through City newsletters, local newspapers, and at public counters at City Hall.

Table 4-9: Age of Housing Stock

Year Built	No. of Units	No. of Units
1939 or earlier	99	0.3%
1940-1949	54	0.2%
1950-1959	85	0.2%
1960-1969	496	1.4%
1970-1979	1,440	4.2%
1980-1989	6,624	19.2%
1990-1999	8,585	24.9%
2000 or later	17,029	49.6%
Total	***31,753***	***100%***

Source: 2009-2011 American Community Survey

4.4 - Housing Costs

This section discusses new home prices and resale costs of existing housing, as well as the average rental prices in the City. The information provided was obtained from reliable real estate industry data sources, the 2010 Census, 2009-2011 American Community Survey, the Riverside County Center for Demographic Research, and data provided by the City.

4.4.1 - Ownership Housing

Following the large increase in housing prices Murrieta experienced from 2000 to 2007, during the previous planning period, the housing market was substantially affected by the housing market collapse and economic downturn that is affecting most cities across the nation. Nationally, housing prices have declined from the peak reached in 2006. Table 4-10 lists the value of existing ownership units in the City in 2010. The 2009-2011 ACS documents a median housing unit value of $276,600, a substantial (41 percent) decrease from the 2007 median value of $472,500. The decrease in home prices is reflective of the housing market throughout California; Table 4-10 also indicates that 81 percent of homes in Murrieta were valued between $300,000 and $1,000,000.

Due to the decrease in home prices, Murrieta remains an affordable alternative to major cities in neighboring Orange, Los Angeles, and San Diego Counties. As home prices decrease in Murrieta the City becomes more affordable to moderate income families that cannot afford a home in Orange, Los Angeles, or San Diego Counties.

Table 4-10: Housing Prices

Price Range	No. of Units	Percentage of Total
Less than $50,000	367	1.7%
$50,000-$99,999	188	0.9%
$100,000-$149,999	1,242	5.7%
$150,000-$199,999	2,265	10.5%
$200,000-$299,999	9,438	43.7%
$300,000-$499,999	6,817	31.5%
$500,000 or more	1,296	6.0%
Total	***22,177***	***100%***
Median Value	$276,600	

Source: 2009-2011American Community Survey

As shown in Table 4-10, home prices have decreased enough that they are affordable even to moderate-income households, who are more likely than low and very low-income households to have a down payment available. For households that are able to afford purchasing a home, Table 4-11 shows the monthly house payment calculated for the average priced existing and new home. This information is useful in determining the affordability of home purchases. In calculating the payments, 20 percent down and a 30-

year mortgage were assumed. The prevailing mortgage rate of 3.5 percent was used in the calculation.

Table 4-11: Owner-Occupied Housing Expenses 2012

Purchase Price	$230,000.00	$375,000.00	$500,000.00
Interest Rate	3.5%	3.5%	3.5%
Down Payment	20%	20%	20%
Loan Amount	$184,000	$300,000	$400,000
Monthly Housing Expense	$1,065	$1,737	$2,317
Required Monthly Income	$3,550	$5,790	$7,723
Required Yearly Income	$42,600	$69,480	$92,680

Source: Bankrate.com and Data Quick November 2012.

The income required to afford a new or existing home requires an annual salary that exceeds a low-income households' ability to pay as determined by HCD 2012 California Income Limits shown in Table 4-13. Existing and new housing is however now affordable to moderate-income households earning between 80-120% AMI. Moderate-income households may also utilize the County of Riverside First-Time Home Buyers Program which is designed to assist households to bridge the gap in affordability between sales price and maximum income restrictions as shown in Table 4-11. This program provides qualified buyers with down payment assistance up to 20% of the purchase price of the home.

4.4.2 - Renter Housing

According to the 2011 American Community Survey, 29 percent of Murrieta households lived in rental housing. The median rent was $1,478 in 2010, a 75 percent increase from the 2000 median rent of $842. In 2012, rents in Murrieta ranged from $750 to $1,545 for a studio or one bedroom apartment, $900 to $1,750 for a two bedroom apartment, and $1,200 to $1,989 for a three bedroom apartment. Generally, these rents fell within the range established by the HUD fair market rents for the County of Riverside as shown in Table 4-12.

Table 4-12: Riverside County Fair Market Rents 2013

Studio	One-Bedroom	Two-Bedroom	Three-Bedroom	Four-Bedroom
$867	$879	$1,116	$1,577	$1,924

Source: HUD User 2012

A survey of homes in Murrieta for rent on Realtor.com revealed that home rental prices vary by size of the home, number of bedrooms, and location. Predominantly, three and four bedroom home rents range from $1,500 to $4,000 per month. Because four bedroom apartments are rare, many large families would need to rent a single-family home in order to avoid overcrowded conditions.

4.4.3 - Housing Affordability

Table 4-13 identifies maximum affordable rents and purchase prices by income category for one person, small family, four person family, and large family. Comparing housing

costs and maximum affordable prices for low-income households shows that many households are being priced out of the Riverside County rental and ownership market. Given the median home prices presented in Table 4-10, single-family home ownership is beyond the reach of very low and most low income households, but affordable to some low and moderate income households. For home rental, most moderate-income households may be able to afford a single family home or condominium.

Table 4-13: Housing Affordability by Income Group Riverside County 2012

Income Group	AMI adjusted by size		Affordable Payment		Housing Costs		Maximum Affordable Price	
			Renter	Owner	Utilities	Taxes & Insurance	Affordable Home Price	Rental
Extremely Low (0-30% MFI)	**30% AMI**							
Two Person (1 bedroom)	$13,293		$332	$332	$50	$80	$47,112	$282
Three Person (2 bedrooms)	$15,192		$380	$380	$75	$90	$50,017	$305
Four Person (3 bedrooms)	$17,091		$427	$427	$100	$95	$54,086	$327
Five Person (4 bedrooms)	$20,509		$513	$513	$125	$100	$66,999	$388
Very Low (30-50% MFI)	**50% AMI**							
One Person (Studio)	$22,155		$554	$554	$50	$115	$90,550	$504
Two Person (1 bedroom)	$25,320		$633	$633	$50	$115	$108,975	$583
Three Person (2 bedrooms)	$28,485		$712	$712	$100	$130	$112,264	$612
Four Person (3 bedrooms)	*$31,650*		*$791*	$791	*$125*	*$140*	$122,538	*$666*
Five Person (4 bedrooms)	$34,182		$855	$855	$175	$145	$124,471	$680
Lower (50-80% MFI)	**60%AMI**	**70%AMI**						
One Person (Studio)	$26,586	$31,017	$775	$775	$48	$150	$134,571	$728
Two Person (1 bedroom)	$30,384	$35,448	$886	$886	$85	$165	$148,140	$801
Three Person (2 bedrooms)	$34,182	$39,879	$997	$997	$125	$190	$158,799	$872
Four Person (3 bedrooms)	$37,980	*$44,310*	$1,108	$1,108	*$175*	*$210*	$168,294	*$933*
Five Person (4 bedrooms)	$41,018	$47,855	$1,196	$1,196	$200	$220	$180,779	$996
Moderate Income (81-120% MFI)	**110% AMI**							
One Person (Studio)	$48,741		$1,219	$1,422	$135	$405	$205,285	$1,084
Two Person (1 bedroom)	$55,704		$1,393	$1,625	$135	$405	$252,575	$1,258
Three Person (2 bedrooms)	$62,667		$1,567	$1,828	$157	$475	$278,442	$1,410
Four Person (3 bedrooms)	$69,630		$1,741	$2,031	$211	*$571*	$290,803	*$1,530*
Five Person (4 bedrooms)	$75,200		$1,880	$2,193	$238	$628	$309,075	$1,642

Notations:

1. Property taxes and insurance based on averages for the region.

2. Calculation of affordable home sales prices based on a down payment of 20%, annual interest rates of 3.5%, and a 30-year mortgage term.

3. Based on 2012 Riverside County MFI $63,300 and 2012 HCD State Income Limits

4. Monthly affordable rent based on payments of no more than 30% of household income.

In November 2012, the starting price for a rental unit in the City was around $800 per month for a one bedroom unit. Rental housing in the City can generally be considered affordable for those families annually earning 50% of the Riverside County median income limit ($64,500) and above. This was determined by multiplying 50% of the AMI ($32,250) by 30% which is HUD's affordability limit for housing costs. The resulting monthly payment affordable to households earning 50% or more of the AMI is $801 a month.

4.4.4 - Existing Affordable Developments

There are currently five residential developments that offer affordable housing options for residents in Murrieta. As shown in Table 4-14, there are a total of 247 deed restricted affordable units for very low-, low and moderate-income households that were constructed between 2000 and 2013. Of the total, 10 units are for extremely low-income, 88 units are for very low-income, 17 are for low-income and 132 are restricted for moderate-income.

Table 4-14: Existing Complexes with Affordable Units

Multifamily Complex	Year	Extremely Low	Very Low	Low	Moderate
Reserves at Madison Park Total Units = 248 units	2004	0	13	0	24
Monte Vista Total Units = 64 units	2005	6	46	6	5
Amber Walk at Ivy Total Units = 93 units	2005	0	5	0	14
Grande Isle Senior Apartments Total Units = 453 units	2007	0	0	0	88
Monte Vista II Total Units = 40 units	2013	4	24	11	1
Total		**10**	**88**	**17**	**132**

Source: City of Murrieta AB 987 Table, 2012.

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Housing Needs

Section 5

Introduction

The housing needs section provides an analysis of current housing conditions in the City, focusing on the demographics outlined in the previous section and housing concerns related to the various population groups of Murrieta. Several factors are projected to influence the degree of demand, or "need," for new housing in the City in coming years. In this element the housing needs of four groups are taken into consideration. These groups include:

- New population growth, both in the City and the surrounding region;
- Residents living in overcrowded units;
- Households paying more than they can afford for housing; and
- "Special needs groups" including the elderly, large families, female-headed households, households with a disabled person, farm workers, and the homeless.

Analysis of demographic and market conditions indicates that the number of households at the high and low ends of the income spectrum will continue to grow, while the traditional middle income segments' participation in the housing market will continue to decline. Consequently analysis of specific housing needs and the necessary assistance for first-time homebuyers will become critical to assist low and moderate-income population in achieving home ownership. Lower income groups will require the most assistance in order to meet the increasing cost burden associated with owning a home. While many new homes are for the most part above the financial attainment of lower income households, there are limited homeownership opportunities for low and moderate-income households with the City's existing stock of older resale homes. In regards to rental households, there appears to be a need for additional rental resources of all sizes at rates affordable to lower income households.

Summary of Special Needs Groups

Table 5-1 below summarizes the housing assistance needs of lower income households (less than 80% of the AMI) for special needs groups in Murrieta by household tenure (renter/owner), household type (elderly, small/large families), and "housing problems." This count of households with "housing problems" includes those who: 1) occupy units with physical defects (lacking complete kitchen or bathroom); 2) live in overcrowded conditions (housing units with more than one person per room); 3) have a housing cost burden exceeding 30% of gross income; or 4) have a severe housing cost burden exceeding 50% of gross income.

Table 5-1: Housing Assistance Needs of Households by Tenure

Household by Type, Income & Housing Problem	Renters			Owners		
	Elderly	Small Families	Large Families	Elderly	Small Families	Large Families
Extremely Low-Income (0-30% MFI)	**145**	**125**	**55**	**340**	**320**	**90**
Number with any housing problems	*135*	*115*	*40*	*280*	*285*	*75*
Number with cost burden > 30%	*135*	*115*	*40*	*285*	*280*	*75*
Number with cost burden > 50%	*135*	*115*	*40*	*270*	*270*	*75*
Very Low-Income (31-50% MFI)	**300**	**420**	**125**	**350**	**245**	**140**
Number with any housing problems	*290*	*420*	*125*	*395*	*235*	*105*
Number with cost burden > 30%	*284*	*420*	*125*	*395*	*235*	*105*
Number with cost burden > 50%	*254*	*405*	*95*	*280*	*210*	*105*
Low-Income (51-80% MFI)	**190**	**700**	**230**	**1,240**	**795**	**395**
Number with any housing problems	*140*	*580*	*230*	*415*	*700*	*330*
Number with cost burden > 30%	*140*	*585*	*230*	*405*	*700*	*320*
Number with cost burden > 50%	*50*	*120*	*70*	*195*	*560*	*305*
Moderate-Income (81% + MFI)	**280**	**1,725**	**560**	**2,650**	**10,155**	**3,595**
Number with any housing problems	*80*	*630*	*230*	*730*	*4,325*	*1,980*
Number with cost burden > 30%	*50*	*535*	*155*	*735*	*4,260*	*1,910*
Number with cost burden > 50%	*0*	*0*	*0*	*205*	*945*	*375*
Total Households	**915**	**2,970**	**970**	**4,580**	**11,515**	**4,220**
Number with any housing problems	*645*	*1,745*	*625*	*1,820*	*5,545*	*2,490*
Number with cost burden > 30%	*609*	*1,655*	*550*	*1,820*	*5,475*	*2,410*
Number with cost burden > 50%	*439*	*640*	*205*	*950*	*1,985*	*860*

HUD Comprehensive Housing Affordability Strategy (CHAS), 2009.

Table 5-1 indicates that within special needs groups, renters experience more housing problems than homeowners. For both renters and owners, more than 50% of all special needs households experienced a housing problem. The highest percentage of lower income households experiencing housing problems were large family renter and owner households. One-hundred percent of renter households and 90% of owner households experience a housing problem. These percentages demonstrate that large family renter households are at the greatest need for housing programs to assist in rehabilitating their homes.

5.1 - Existing Need

State housing policy recognizes that cooperative participation between the private and public sectors is necessary to expand housing opportunities to all economic segments of the community. A primary State goal is the provision of decent housing and suitable living environment for Californians of all economic levels. Historically, the private sector has responded to the majority of the community's housing needs through the production of market-rate

housing. However, the percentage of the population on a statewide basis who can afford market rate housing is declining. Special needs groups are consequently experiencing additional housing challenges associated with their unique characteristics.

The following subsections analyze the households in Murrieta, which experience some type of problem in their housing situation: overcrowding; overpayment; and special needs groups including the elderly, large-families, female headed households, the disabled, the homeless and farm workers.

5.1.1 - Overpayment

A primary State goal is the provision of decent housing and a suitable living environment for Californians of all economic levels. State housing policy recognizes that cooperative participation of the private and public sectors are necessary to expand housing opportunities to all economic segments of the community.

Consistent with HUD's "threshold of overpayment" definition, California's Health and Safety Code, Section 50052.9 states that, "Affordable housing costs with respect to extremely low-, very low-, and low-income households shall not exceed 30% of gross household income and 35% of gross household income for moderate-income households." That is, when households must exceed 30% of their incomes for rent or mortgage payments, they are left with insufficient funds for other necessities, such as food, health care, clothing, and utilities.

Exceeding 30% of income for rent or mortgage may cause a series of related financial problems, and can result in a deterioration of housing stock, because costs associated with maintenance must be sacrificed for more immediate expenses (e.g. food, clothing, medical care, and utilities). Overpayment also promotes overcrowding, which leads to a variety of problems, from accelerating the rate of deterioration to code enforcement issues. The State recognizes, however, that upper-income households are generally more able to secure housing within their budgets, and are more capable of paying a larger proportion of their income for housing. Therefore, housing overpayment estimates usually focus on lower income groups.

Table 5-2: Overpaying Households by Tenure

Tenure	Households Overpaying
Renter	4,970
Owner	9,812
Total	***14,782***

Source: 2009-2011 American Community Survey

The 2009-2011 American Community Survey identifies housing overpayment for lower income households. Table 5-2 displays total housing units overpaying for housing based on tenure. The majority of households overpaying (66 percent) were owner-occupied units. According to Comprehensive Housing Affordability Strategy data, 3,110 lower income households were overpaying for rental or owner housing. Out of this total, 627 extremely low-income households overpaid for housing. Table 5-3 displays that 59% of owner-occupied households experienced more overpayment than renter households; the highest total occurring in low-income households.

Table 5-3: Overpayment by Income Level

Tenure by Household	Extremely Low-Income	Very Low-Income	Low-Income	Total Overpaying
Renter	283	444	539	1,266
Owner	344	463	1,037	1,844
Total	***627***	***907***	***1,576***	***3,110***

Source: HUD Comprehensive Housing Affordability Strategy (CHAS) Databook, 2009

5.1.2 - Overcrowding

In response to higher housing prices, lower-income households must often be satisfied with smaller, less adequate housing for their available income. This may result in overcrowding which places a strain on physical facilities and does not provide a healthy living environment. Overcrowding is defined by the Census as a unit occupied by 1.01 persons or more per room (excluding bathrooms and kitchens). Units with more than 1.50 persons per room are considered severely overcrowded. Overcrowding is often reflective of one of three conditions:

1. Either a family or household is living in too small a dwelling;
2. Familial households includes extended family members (i.e. grandparents or grown children and their families living with parents, termed doubling); or
3. A family is renting living space to non-family members.

According to the 2009-2011 American Community Survey, overcrowding affected 643 units, or 2.1 percent of all households in Murrieta. Additionally, 111 housing units (0.4 percent) were classified as severely overcrowded. In comparison to Riverside County, Murrieta was significantly below the County percentages of 5.6 percent and 2.0 percent respectively. Typically, very low-income rental households experience the most overcrowding. This is because very low-income residents are often unable to afford the month rent required to secure a unit with an adequate number of bedrooms to meet the needs of their household.

5.2 - Special Needs Groups

State Housing Law requires that the special needs of certain disadvantaged groups be addressed within the Housing Element. These households typically experience difficulty in securing decent, affordable housing, and are not maintained under market conditions. The needs of the elderly, handicapped, large families, female heads of household, the homeless and farm workers are addressed below.

5.2.1 - Elderly

The special housing needs of the elderly are an important concern in Murrieta. Many of the elderly resident in the City are retired and living on a fixed low-income, which puts them at greater risk of impaction, or housing overpayment. In addition, the elderly maintain special needs related to housing construction and location. The elderly often require ramps, handrails, lower cupboards and counters to allow greater access and mobility. In terms of location, because of limited mobility, the elderly typically need

access to public facilities (i.e., medical and shopping) and public transit facilities. Finding a reliable means of transportation to medical appointments, senior activity and meal sites remains a serious problem for seniors. Many seniors lack private transportation due to physical or financial limitations. Because of this, the Riverside Transit Agency provides a dial-a-ride shuttle service that can be used by the elderly for transportation.

As reported in the 2009-2011 American Community Survey, 9,711 City residents, or 9.4 percent of the total population, were 65 years old or older. In terms of tenure, 4,277 owner-occupied and 1,316 renter-occupied units were headed by occupants 65 years old or older.

Many elderly persons have limited income potential, as they are most often retired and have fixed income. Table 5-1 revealed that 66% of lower income senior households (62 years old or older) paid more than 30% of their income on housing, experiencing a housing cost burden. While the vast majority of seniors are homeowners, the percentage of lower income senior renters who overpaid (95 percent) was higher than senior homeowners (61 percent) who overpaid. Lower income renter senior households experienced a greater percentage of housing problems (71 percent) than lower income senior homeowners (40 percent) as shown in Table 5-1.

In 2010, 35 percent of the elderly population was disabled. Despite the large number of seniors who have disabilities, 9 percent live alone, according to the Census. However, the vast majority of elderly own their home, estimated at 89 percent in 2010.

5.2.2 - Disabled Household Needs

Access and affordability are the two major housing needs of disabled persons. Access is particularly important for the physically disabled. Physically disabled persons often require specially designed dwellings to permit access within the unit, as well as to and from the site. The California Administrative Code Title 24 sets forth access and adaptability requirements for the disabled. These regulations apply to public buildings such as motels, employee housing, factory built housing, and privately funded newly constructed apartment houses containing five or more dwelling units. The regulations also require that ramp-ways, larger door widths, and restroom modifications, be designed which enable access to the disabled. Such standards, however, are not mandatory of new single-family residential construction.

The disabled, like the elderly, have special needs with regard to location. There is typically a desire to be located near public facilities, and especially near transportation facilities that provide service to those who rely on them. The needs for residents with mobility limitations are currently being met by the Riverside Transit Agency through a dial-a-ride service with specialized transportation vehicles for those who are not able to provide their own transportation or reach established boarding areas for the City bus routes.

Table 5-4 reflects that 6,242 persons 18 years and older in the City of Murrieta had a disability in 2010. A disability with a self-care limitation does not necessarily translate into a need for specially constructed housing units; therefore it makes it difficult to estimate the number of disabled persons in need of housing. Out of the total disabled

persons, 3,181 persons had an ambulatory disability that hindered their mobility. An additional 2,116 residents had an independent care disability that may require special housing facilities. For this reason, the need for programs to assist disabled households on a fixed income is important.

Table 5-4: Disabled Residents

Persons with Disabilities 18 to 64	*2,818*
Hearing Disability	694
Vision Disability	327
Cognitive Disability	1,172
Ambulatory Disability	1,108
Self-Care Disability	396
Independent Living Disability	705
Persons with Disabilities 65 Years and Over	*3,424*
Hearing Disability	1,254
Vision Disability	496
Cognitive Disability	840
Ambulatory Disability	2,073
Self-Care Disability	851
Independent Living Disability	1,411

Source: 2009-2011 American Community Survey 3-Year Estimates

Currently there is no direct source that provides information on the number of housing units in the City equipped to handle the needs of disabled citizens. The City, therefore, needs to have programs to ensure that all affected households have the means to be able to provide the necessary improvements on an as-needed basis. Through Riverside County and the Office on Aging, the County is able to offer assistance to qualifying low-income households to provide the necessary improvements that will make their homes accessible as needed.

5.2.3 - Developmentally Disabled

Section 4512 of the California Welfare and Institutions Code defines a "Developmental disability" as a disability that originates before an individual attains age 18 years, continues, or can be expected to continue, indefinitely, and constitutes a substantial disability for that individual which includes mental retardation, cerebral palsy, epilepsy, and autism. This term also includes disabling conditions found to be closely related to mental retardation or to require treatment similar to that required for individuals with mental retardation, but shall not include other handicapping conditions that are solely physical in nature.

Many developmentally disabled persons can live and work independently within a conventional housing environment. More severely disabled individuals require a group living environment where supervision is provided. The most severely affected individuals may require an institutional environment where medical attention and physical therapy are provided. Because developmental disabilities exist before adulthood, the first issue in

supportive housing for the developmentally disabled is the transition from the person's living situation as a child to an appropriate level of independence as an adult.
The State Department of Developmental Services (DDS) currently provides community based services to approximately 243,000 persons with developmental disabilities and their families through a statewide system of 21 regional centers, four developmental centers, and two community-based facilities. The Inland Regional Center is one of 21 regional centers in the State of California that provides point of entry to services for people with developmental disabilities. The center is a private, non-profit community agency that contracts with local businesses to offer a wide range of services to individuals with developmental disabilities and their families.

Table 5-5 provides information from the Inland Regional Center of on the number of developmentally disabled individuals in the City of Murrieta. In 2012, there were approximately 527 individuals (0.5 percent of the total population) actively utilizing services at the Inland Regional Center for a developmental disability.

Table 5-5: Developmentally Disabled Residents

Zip Code Area	Age					Total
	0-14	15-22	23-54	55-65	65+	
92562	111	85	68	9	1	274
92563	123	65	62	3	0	253
92564	0	0	0	0	0	0
Total	234	150	130	12	1	527

Source: Inland Regional Center, 2012.

To assist in the provision of housing to needs of persons living with a developmental disability, the City will implement programs to coordinate housing activities and outreach with the Inland Regional Center. Murrieta will also encourage housing developers to designate a portion of new affordable housing developments for persons with disabilities, especially persons with developmental disabilities, and pursue funding sources designated for persons with special needs and disabilities.

5.2.4 - Large Family Household Needs

The 2010 Census reported 5,778 households in the City of Murrieta with five or more persons. Large family households require special consideration because they require larger dwellings with sufficient bedrooms to meet their housing needs, without overcrowding. Of the 5,788 large households in the City, approximately 5,708 (99 percent) were family households.

Difficulties in securing housing large enough to accommodate all members of a household are heightened for renters, because multifamily rental units are typically smaller than single-family units. Apartment complexes in the City offering three- and four-bedroom models are few. Large families in Murrieta, therefore, may satisfy their housing needs mostly through the rental and ownership of single-family units, for which there appears to be sufficient stock. However, as shown previously in the Housing Costs

Section, the larger single-family rental stock is generally not affordable to the majority of lower income households.

Table 5-6 reveals tenure of housing units by number of persons in the unit. The table shows that there are more owner-occupied units than renter-occupied units housing large families. Owner-occupied units account for 62 percent of the large households in the City, representing about 17 percent of all owner-occupied housing; while 38 percent of large households occupy rental units in the City.

Table 5-6: Large Households by Tenure

Number of Persons in Unit	Owner-Occupied	Renter-Occupied	Total
Five	2,404	1,305	3,709
Six	610	433	1,043
Seven or more	563	463	1,026
Total	***3,577***	***2,201***	***5,778***

Source: 2009-2011 American Community Survey 3-Year Estimates

5.2.5 - Female-Head of Household

The primary concern in this segment of the population is households with only one parent. This creates conflicts between the economic needs of the home and the daycare needs of the family. Historically, females in this situation have earned less income than the rest of the population, restricting their ability to provide for both housing and daycare. According to the 2009-2011 ACS, there were 3,397 female-headed households in the City; 2,230 (66 percent) of which had children under 18 years old. Of the female headed households, with children under 18 years old, 29 percent were below the federally established poverty level; compared to Riverside County at 35 percent.

With existing housing programs, female-headed households can be eligible to qualify for housing assistance, such as Section 8 vouchers, based on income level. One program available to single parent households is the CalWORKs Greater Avenues for Independence (GAIN) program, which is a program of the Riverside County Department of Public Social Services. This program assists applicants and recipients of temporary assistance to become self-sufficient. This program provides child care and transportation assistance.

5.2.6 - Farm Worker Housing

In the 2009-2011 American Community Survey, approximately 63 people were classified as working in the agriculture industry sector a decrease from the estimate of 303 in 2007. Although Murrieta and Riverside County contain a number of major employers in southern California, this growth is not tied to an agricultural base. Although some land in the City remains for agricultural use, most land previously used for agricultural uses is currently developed or designated for commercial or residential development. Majority of the lower density land in the City is not used for agriculture, but rather for equestrian purposes with some land remaining for personal farming in comparison with commercial farm operations. Consequently, the estimated 63 individuals identified as working in the agricultural sector are likely to be employed in nurseries, stables, and not in traditional agricultural production. The demand for housing generated by farm workers in the City is thus estimated to be extremely low. The City does allow for second dwelling units to

be constructed in the rural and estate residential zones which can provide units for employees working in these areas. The City also has a number of affordable multifamily units that also provide housing for employees in the sector.

5.2.7 - Homeless Persons

The RHNA produced by SCAG defines homelessness as:

1. Persons who are living or staying in emergency shelters;
2. Persons who sleep outside, in a makeshift shelter, in cars, or transportation areas such as bus or train terminals;
3. Persons who are considered "at risk" (i.e., doubled up, in marginal circumstances, motel population with limited stay or general relief recipients whose payments have been canceled due to "no forwarding address").

Enumerating the homeless population is difficult because of the transient nature of this population, as well as, the existence of hidden homeless or persons that move around in temporary housing situations (e.g. doubling up with another household). However, according to the 2012 County of Riverside Homeless Assessment, there were an estimated 6,203 homeless persons on any given day in Riverside County. Specific information within the 2011 County of Riverside Homeless County and Survey Comprehensive Report indicates that there were 2 unsheltered homeless individuals in Murrieta that were identified by service providers.

The trends largely responsible for homelessness include: a shortage of affordable housing, combined with a simultaneous growth in the population of low-income renters, which has correlated with high demand and limited supply of affordable units. Each of these factors could potentially exacerbate any of the traditional conditions, but may increasingly become stand-alone causes of homelessness. The numbers of homeless people, the cost of housing, and the number of people living in poverty combine to create a potential for homelessness.

To better provide for the needs of homeless and those families at-risk of homeless, the Murrieta Zoning Code was recently amended to address transitional and emergency housing. Approved by City Council on October 15, 2013, the City amended the development standards for the Business Park (BP) zone to allow emergency shelters by right, without a Conditional Use Permit or other discretionary action. Per the Zoning Code a proposed emergency shelter is subject to development standards that are no more restricting than those permitted by State law. The BP zone is appropriate to accommodate emergency shelters as it is typically located along major arterial roadways with access to employment centers and in close proximity to commercial and retail stores as well as social services. There are currently 376 acres of vacant land zoned BP, including approximately 46 sites between 2 and 5 acres in size that are appropriate and able to accommodate a shelter of approximately 20 beds if one is proposed. To better accommodate emergency shelters in the City, specific siting standards and conditions for approval have been developed in Section 16.44.200 of the Murrieta Zoning Code.

Section 16.44.200 of the Murrieta Zoning Code includes specific operating and locational standards detailing the conditions and requirements for operations of such housing and shelters. Although no homeless shelters exist in Murrieta due to the limited number of

homeless persons, the City does provide support to shelters located near Murrieta located in Wildomar and Lake Elsinore. On October 15, 2013, the City also amended the Zoning Code to permit transitional and supportive housing as a residential use in all zones that allow residential uses subject only to the same regulations that apply to other permitted residential uses in the same zone.

Another means of assisting the homeless is through community outreach programs sponsored by non-profit organizations. King's Hall is a shelter for the homeless located at March Air Reserve Base approximately 20 miles from Murrieta. The shelter is run by the Path of Life Ministries and uses volunteers from the Calvary Chapel in Murrieta to maintain the shelter. King's Hall is a transitional housing program for homeless women with children, single men with children, complete families, and chronic homeless women. Also, the Community Food Pantry and Second Hand Treasures of Murrieta distribute food to needy families while providing families the opportunity to purchase clothing, furniture, and household items at discounted prices. This community outreach program is sponsored by St. Martha's Catholic Church in Murrieta. Finally, individuals can also access vouchers for temporary housing through the Inclement Weather Voucher Program through the Temecula/Murrieta Rescue Mission

5.3 - Assisted Housing At-Risk of Conversion to Market Rate Housing

State housing law requires an inventory and analysis of government-assisted dwellings units eligible for conversion from low-income housing to market rate housing during the next ten years, or until 2018 for this at-risk planning period. Reasons for potential conversion may include expiration of subsidies, mortgage pre-payments or pay-offs, and concurrent expiration of affordability restrictions. A review of the assisted housing inventory maintained by HUD indicates that no assisted units are subject to the expiration of affordability restrictions in the next planning period or within the next ten years.[3] To ensure continued affordability, five complexes were constructed between 2000 and 2013 that have deed restricted units maintained through an affordability covenant. The following table lists five apartment complexes that were built between 2000 and 2013, and the amount of units in each complex that were allocated for each income level. Units that are deed restricted are identified with "DR".

[3] California Housing Partnership Corporation (List of at-risk properties filing notices with HCD); Department of Housing and Urban Development; City of Murrieta

Table 5-7: At-Risk Multifamily Affordable Units

Project	Total Units	Total Affordable Units	Date Constructed	Affordability Period	Covenant Expiration Date
Monte Vista Apartments	64	64	2005	55 Years	2060
Grand Isle Senior Apartments	453	88	2007	55 Years	2061
Amber Walk at Ivy	111	6	2006	45 Years	2051
Reserves at Madison Park	248	47	2005	45 Years	2051
Monte Vista II	40	40	2013	55 Years	2068

Source: City of Murrieta, 2013.

As Table 5-7 displays, five residential projects were constructed between 2000 and 2013 that have deed restrictions. The deed restrictions range from 45 to 55 years ensuring these deed restrictions will not expire during the upcoming planning period. Since these deed restrictions are not set to expire in the upcoming planning period and there are no at-risk units in the City, further analysis of costs and programs for preserving such units is not necessary.

5.3.1 - Public Agencies and Non-Profit Corporations

The analysis of existing assisted living developments must "identify public and private non-profit corporations known to the local government which have legal and managerial capacity to acquire and manage these housing developments." The State HCD has compiled a list of entities interested in a "right of first refusal" in connection with the possible acquisition of assisted housing projects. The entities that have expressed an interest in Riverside County properties are listed below:

- Valley Housing Coalition
- Southern California Presbyterian Jamboree Housing Corporation
- Long Beach Affordable Housing Coalition, Inc
- Los Angeles Community Design Center
- Neighborhood Housing Services of the Inland Empire, Inc
- St. Vincent de Paul Village, San Diego
- San Diego Interfaith Housing Foundation
- Southern California Housing Development Corp

These local public agencies, public or private non-profit corporations, and for-profit organizations identified have the legal and managerial capacity to acquire and manage at-risk projects.

5.4 - Regional Housing Needs Assessment

California's State Housing Element law requires that each city and county develop local housing programs designed to meet its "fair share" of existing and future housing needs for all income groups. This effort is coordinated by the jurisdiction's Council of Governments (The City of Murrieta is in the Western Riverside Council of Governments) when preparing the State-mandated Housing Element of its General Plan. This "fair share" allocation concept seeks to ensure that each jurisdiction accepts responsibility for the housing needs of not only its resident population, but for all households who might reasonably be expected to reside within the jurisdiction, particularly lower income households. This assumes the availability of a variety and choice of housing accommodations appropriate to their needs, as well as certain mobility among households within the regional market.

5.4.1 - Overview of the SCAG Fair Share Allocation Process

The fair share allocation process begins with the State Department of Finance's projection of statewide housing demand for an eight year period, which is then apportioned by HCD among each of the State's official regions. The regions are represented by an agency typically termed a Council of Government (COG). In the six county southern California region, which includes Murrieta and all other incorporated cities and unincorporated areas of Riverside County, the agency responsible for assigning these fair share goals to each jurisdiction is the Southern California Association of Governments (SCAG).

A local jurisdiction's "fair share" of regional housing need is the number of additional dwelling units that will need to be constructed during a given eight-year planning period. SCAG estimates each jurisdiction's future housing need in terms of four factors:

1. The number of units needed to accommodate forecasted household growth;
2. The number of units needed to replace demolitions due to attrition in the housing stock (i.e., fire damage, obsolescence, redevelopment and conversions to non-housing uses);
3. Maintaining an ideal vacancy rate for a well-functioning housing market; and
4. An adjustment to avoid an over-concentration of lower-income households in any one jurisdiction.

The new construction need must be allocated to four household income categories used in Federal and State programs: very low-, low-, moderate-, and above moderate-income, defined operationally as households earning up to 50% , 80% , 120%, and more than 120% of the Riverside County median income, respectively. The allocations are further adjusted to avoid an over-concentration of lower income households in any one jurisdiction. The fair share allocation must also consider the existing "deficit" of housing resulting from lower income households that pay more than 30% of their incomes for housing costs. As discussed earlier, this is the threshold used by HUD to determine housing affordability. The 2014-2021 Regional Housing Needs Assessment for the City of Murrieta is shown in Table 5-8.

Table 5-8: Fair Share Housing Needs 2014-2021

Very Low	Low	Moderate	Above Moderate	Total Adjusted Need
395	262	289	627	1,573

Source: Regional Housing Needs Assessment, SCAG October 2012.

Note: The 8 year planning period extends from January 1, 2014 to September 30, 2021.

Thus, Murrieta's "fair share" allocation for the planning period is 1,573 units. This is a substantial decrease from the 2008-2014 allocation of 6,303 units. According to Housing Element Law Section 65583, local agencies shall calculate the subset of very low-income households that qualify as extremely low-income households (30% or less of the Riverside County median income) by using available Census data to calculate the percentage of very low-income households that qualify as extremely low-income households.

The 2009-2011 ACS reported that there were 2,639 households (8.5 percent) earning less than 30% of the 2008 Riverside County Area Median Income of $62,000 (or $19,080 annually). The 2014 SCAG RHNA projected 395 very low-income households in the upcoming planning period. To determine the RHNA allocation of extremely low-income households, HCD recommends assuming that 50 percent of very low-income households are actually extremely low-income. This means that with a RHNA allocation of 395, the City should allocate 198 units for extremely low-income and the remaining 197 units for very low-income. The Housing Plan in Section 2 describes policies and programs that the City can utilize towards implementing this housing needs allocation.

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Housing Constraints Analysis

Section 6

Pursuant to State law, a Housing Element shall provide an analysis of existing and potential governmental and non-governmental constraints on the improvement, maintenance, and development of the housing stock. This analysis must include housing for all segments of the population including all income levels and persons with special needs (such as the homeless, disabled, and elderly). Governmental and non-governmental constraints are discussed in this section.

6.1 - Governmental Constraints

Local policies and regulations can affect the availability of housing and in particular, the provision of affordable housing. Land use controls, site improvement requirements, fees and exactions, permit processing procedures, and other factors can affect the maintenance, development, and improvement of housing.

State, Federal and Regional regulations, which the City has no control over, also affect the availability of land for housing and the cost of producing housing. Regulations related to environmental protection, building codes, and other topics have significant, often adverse impacts on housing cost and availability. While constraints exist at other levels of government, this section emphasizes policies and regulations that are under the control of the City.

Key Policies and Regulations Affecting Housing Costs	
City of Murrieta Controlled	**Non-City Controlled**
Zoning /Development Standards	MSHCP Requirements and Fees
Density / Open Space	TUMF Fees
Site Improvements	Environmental Impact Analysis
Impact Fees and Exactions	Building Codes
Permit Processing Time	Availability of Capital for New Construction
Parking	School Impact Fees

It is important to note that the City of Murrieta's intent is to find a balance between implementing community standards and quality for new residential development, and maintaining a development review process and appropriate regulations that do not unreasonably constrain new residential construction. The City of Murrieta has been successful in achieving that balance as evidenced by: (1) the construction of approximately 17,029 new residential units since 2000, including 4,864 multiple-family units; and (2) the affordability of many newer market-rate multiple-family units (rental and ownership) for moderate-income households. Consequently, the number and cost of many newer residences is a clear indicator that the constraints outlined in this chapter are not hindering the construction of affordable and market-rate housing in the City of Murrieta.

6.1.1 - Land Use Designations, Standards and Procedures

Land use controls take a number of forms which affect the development of housing. One example of a land use control is the City's General Plan, which establishes the overall character and development of the community. On July 19, 2011, the Murrieta City Council voted to adopt General Plan 2035. The updated General Plan aims to simplify the land use designations, reducing the number designations that allow residential uses from 8 to 4 categories. Additionally, Title 16 of the Murrieta Municipal Code (Development Code) identifies eight residential zoning districts. Table 6-1 below shows how new General Plan land use designations correspond to the existing zones in the City of Murrieta Municipal Code.

Table 6-1: General Plan and Zoning Code Consistency

Land Use Designation	Consistent Zoning Classifications	Allowable Density Range
Large Lot Residential	RR, ER-1	0.1 – 1.0 du/ac
Single-Family	ER-2, ER-3, SF-1, SF-2	1.1 – 10.0 du/ac
Multiple-Family Residential	MF-1, MF-2, MF-3	10.1 – 30.0 du/ac
Mixed Use	MU-1, MU-2, MU-3	30 du/ac

Source: City Source: City of Murrieta Title 16 Development Code and 2025 General Plan Land Use Element, 2012.

Density is a critical factor in the development of affordable housing. Maintaining low density detached dwellings typically increases the cost of construction per unit, while higher density attached development lowers the per-unit land cost and facilitates improved construction efficiency. The Murrieta General Plan and Development Code currently allow for the development of housing up to a density of 30 dwelling units per acre. Of the housing developments constructed in the previous decade, the City has encouraged and approved housing for a variety of income levels that meet their established density requirements. In addition to the multifamily residential designations, the City has also established a density bonus that allows developers to go above the established densities; however developers offered the bonus have not chosen to take advantage of the opportunity. Within the City's existing land use designations, the Multiple-Family Residential and Mixed Use designations are most appropriate to accommodate housing at densities affordable to lower income households, consistent with HCD's interpretation of State law.

6.1.1.A - Minimum Lot Size Requirements

Large-lot zoning (minimum 5 acres per lot) is currently required for multifamily zones including the MF-1 and MF-2 zones. This requirement does not pertain to any existing and recorded lots and therefore does not pertain to the majority of the City. The SF-1 zone requires a minimum of 7,200 square feet per lot. This requirement is typical in suburban communities and is not excessive or burdensome in that it does not exclude most lots from developing residential uses at an achievable maximum density assumed under these zones. In contrast the minimum lot size requirement for an SF-2 zoned parcel is 5,000 square feet, which is appropriate to achieve a denser type of housing development.

Several of the housing opportunity sites in Murrieta, as shown *Chapter 7, Housing Resources*, are larger than 5 acres. To address large lot development the City implemented a large lot subdivision program to the Housing Plan. While many recorded parcels in the City are large, Staff has historically worked with affordable housing developers to construct affordable units on sites that are smaller than 5 acres. During the 2008-2014 planning period, the City of Murrieta worked with an affordable housing developer to construct a 40 unit, deed-restricted, development on 2 acres of land with all units affordable for extremely low, very low and low income families. The City will continue to offer flexible development standards in instances where affordable units will be created. It is rare that a developer would not meet the minimum lot size requirements; however in the event that it is a constraint to affordable housing, Action 3.5 will assure that the City addresses the standard and will work with the developer to alter the standard to produce affordable units.

6.1.2 - Development Code

The City of Murrieta Development Code establishes specific development standards, allowable uses and other limitations, and must be consistent with the community's standards as set forth in the General Plan. Zoning regulations control development by establishing requirements related to height, density, lot area, yard setbacks, and minimum parking spaces. Site development standards ensure a quality living environment for all households groups in the City, including special needs groups, and low- and moderate-income households. Differences in development standards are just one factor of many that can affect the relative affordability of housing.

Approximately 76% of residential units in Murrieta are single-family detached homes. Some of these units are located in the RR, ER and SF zones, with the majority of residential areas in the City zoned SF-1. Single-family subdivisions are the primary type of development in this designation. Developments in the single-family residential zones range in density from 2 to 10 dwelling units per acre and have uniform lot patterns, with a minimum lot size of 7,200 square feet. Cluster developments with smaller lot sizes of 5,000 to 6,000 square feet are possible within the Master Plan Overlay district, so long as the size is justified through the provision of significant open space, recreational facilities, and/or other public amenities.

In comparison to single-family units, multifamily attached units make up approximately 15% of the total housing stock in Murrieta in 2010. These units are often constructed in the multifamily zones which allow for between 10 and 18 dwelling units per acre. The City has identified that developments should occur on parcels between 5 to 15 acres in size; however, City Staff has historically worked with developers to design affordable housing complexes on smaller sites when feasible and will continue to do so. The City may encourage lot consolidation or will discuss density bonus opportunities in order to increase the number of units on-site.

Table 6-2 provides a summary of development standards permitted residential uses for each zoning district, along with development standards for each, including setbacks, lot coverage, and maximum building height.

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Table 6-2: Summary of Residential Zoning Districts

Development Standard	RR	ER-1	ER-2	ER-3	SF-1	SF-2	MF-1	MF-2	MF-3	MU-3
Density Permitted	0.1-0.4 du/ac	0.4-1.0 du/ac	1-2 du/ac	2-3 du/ac	2-5 du/ac	5-10 du/ac	10-15 du/ac	15-18 du/ac	40 du/ac	15-30
Lot coverage	25%	25%	25%	35%	35%; 45% for single story	50%	35%	35%	None	None
Minimum Width Dimensions	100 ft.	100 ft.	100 ft.	70 ft.	70 ft.	55 ft.	100 ft.	100 ft.	None	None
Minimum Setback: Front Yard	20 ft.	20 ft.	20 ft.	20 ft.	20 ft.	20 ft.	10 ft.	10 ft.	10-20 ft.	25 ft.
Minimum Setback: Side Yard (interior)	20 ft.	20 ft.	20 ft.	10 ft.	10 ft.	7.5 ft.	10 ft.	10 ft.	10 ft.	None*
Minimum Setback: Side Yard (street side)	20 ft.	20 ft.	20 ft.	20 ft.	20 ft.	10 ft.	10 ft.	10 ft.	10 ft.	25 ft.
Minimum Setback: Rear Yard	20 ft.	20 ft.	20 ft.	20 ft.	20 ft.	20 ft.	10 ft.	10 ft.	10 ft.	None*
Maximum Building Height	40 ft.	40 ft.	40 ft.	35 ft.	35 ft.	35 ft.	50 ft.	50 ft.	70 ft	50 ft.

*Twenty (20) feet if adjacent to residential zoning district and twenty-five (25) feet if adjacent to a freeway
Source: City of Murrieta Title 16 Development Code

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In general, the development standards found in the City of Murrieta Development Code are comparable to those of jurisdictions in the surrounding area including the County of Riverside Zoning Code. The setbacks, minimum lot sizes and minimum lot dimensions are similar if not the same. The building heights allowed by the City of Murrieta are lower than those of the County, however the City's standard still allows for the development of a multi-story structure without requiring a variance.

Within the City's Development Code there are two standards that are not addressed in Table 6-2 that may create constraints to the development of affordable housing in the City. These standards include: parking requirements and open space requirements. To minimize constraints and maintain incentive for affordable housing developers, the City relies primarily on the application of Density Bonuses and Specific Plans or a reduction in the required standards. The City may consider additional concessions to offset developer costs by providing waivers or modifying development fees to make low-income and senior housing units more economically feasible.

6.1.2.A - Parking Requirements

The City's parking standards for residential developments are tailored to the vehicle ownership patterns associated with different residential uses. All single-family residential homes must have two spaces within an enclosed garage. However, parking requirements for multiple-family units vary depending on the number of bedrooms in each unit. Guest parking is based on a percentage of the total number of units. To facilitate the development of affordable units, the City will consider an incentive, reduction or elimination of the garage requirement, which will reduce the constraint on the development of affordable housing. Parking standards for residential developments in Murrieta are shown in Table 6-3.

Table 6-3: Residential Parking Requirements

Residential Type	Required Parking
Single-Family	Two spaces in a fully enclosed garage.
Duplex	Two spaces for each unit, with at least one space in a fully enclosed garage.
Multifamily Rental	Studio and one bedroom units: 1.5 spaces for each unit, with one space for each unit in a fully enclosed garage, plus guest parking. Two bedrooms or more: 2 spaces for each unit, plus 0.5 additional spaces for each bedroom over 2, with one space for each unit in a fully enclosed garage, plus guest parking equal to 25% of the total number of units.
Multifamily Ownership	Studio, one bedroom and two bedroom units: Two covered spaces for each unit, with one space for each unit in a fully enclosed garage, plus guest parking. Three bedrooms or more: Two spaces for each unit with one space for each unit in a fully enclosed garage; plus 0.5 additional spaces for each bedroom over 2; plus guest parking equal to 33% of the total number of units evenly spread throughout the entire project.

Source: City of Murrieta Title 16 Development Code

While the City's parking requirements could be viewed as a constraint to the construction of multifamily affordable housing, the City offers developers the option to utilize a density bonus, which also permits the construction of carports in lieu of enclosed garages. Recently, the City worked with Affirmed Housing, the developer of Monte Vista Apartments and Monte Vista II, to approve affordable housing that did not require the construction of garages. These examples illustrate that the City is committed to working with developers to promote the development of affordable units through the modification of development standards. The City of Murrieta is determined and historically has been successful in addressing specific development constraints and has created Action 3.5 to ensure that any residential development standards that may constrain the future development of affordable housing are removed.

6.1.2.B - Open Space Requirements

To improve the living environment of residential neighborhoods, communities typically require housing to have a required amount of common and private open space, such as yards, patios and landscaping areas. For single-family homes, open space is achieved through setbacks and lot coverage limits. For multifamily projects open space is more important due to the fact that residents do not have their own yard. Therefore, private and common open space requirements ensure that multifamily units have adequate open space for landscaping and recreation.

Both multifamily zoning districts require 60 square feet of private open space if on upper floor(s) and 100 square feet of private open space if on the ground floor. Additionally, 200 square feet of common open space is required for each unit. Open space requirements could constrain the development of housing in terms of having land available that provides sufficient open space to satisfy the City's requirements. However, the City's open space requirements are considered standard for most cities in southern California and do not act as a considerable constraint to housing development.

6.1.3 - Mixed Use Zones

The City of Murrieta recognizes the importance of locating affordable housing near services. The City currently has three mixed use zones, one of which allows for a mix of residential and commercial development. As part of the General Plan update the City has established a General Plan policy with performance standards to ensure that the sites zoned for mixed use are developed to be truly mixed use projects with a required residential component. The General Plan indicates that the mixed use designation provides for a horizontal or vertical mix of residential and non-residential uses, and utilizes both residential density and non-residential intensity standards. Floor area ratios up to 1.0 are permitted and the base residential density is 30 units per acre.

Within the Development Code there are currently no other requirements limiting the placement or design of a project that includes both residential and commercial uses.

6.1.4 - Transit Oriented Development

As part of the General Plan 2035 the City established policies to encourage future development that are consistent and cohesive with future public transportation plans in the City. Regionally, there are proposed plans for alternative transportation modes,

including light rail and/or high speed rail, to have systems and potential stations in Murrieta.

Potential transit-oriented development (TOD) in Murrieta will occur in a district with frequent public transit, and encourage taller buildings, a mix of commercial and residential uses, and facilitate easy pedestrian movement. For transit-oriented development, decisions about density, building heights, street design, sidewalk widths, crosswalks, flow of traffic and parking would be made with the intent of encouraging people to walk and use public transit rather than giving priority to cars. A transit village is not a one-size-fits-all model for development, but rather a way of coordinating local land use and transportation planning to reinforce each other.

To better plan for and facilitate higher density development near future transit sites, the City has established a Transit Oriented Development Overlay. The TOD Overlay is intended to allow a mixture of residential and non-residential development in close proximity to transit. The Overlay has been applied to approximately 78 acres and encompasses land on either side of Interstate 15 (I-15). The area is bound by Los Alamos Road to the north, Jefferson Avenue to the west, Vista Murrieta and Hancock to the east, and just north of Guava and Murrieta Hot Springs Road to the south. This area is also uniquely situated adjacent to the convergence of two freeways (I-15 and I-215) and along the route of the proposed High Speed Rail. The City is currently working with the cities of Temecula, Lake Elsinore, and Wildomar to establish Jefferson Avenue as a multi-modal transit corridor, connecting all the cities and to provide smart growth opportunities, including a mixture of residential and non-residential uses. The TOD Overlay permits, by right, 30 dwelling units per acre, and can potentially accommodate approximately 2,340 units.

6.1.5 - Density Bonus

Chapter 16.20 of the City's Development Code addresses affordable housing incentives and density bonus provisions. State law mandates that all cities and counties shall adopt an ordinance that specifies how the city/county intends to comply with Government Code Sections 65915-65918 regarding density bonus opportunities. In order to be eligible for a density bonus and other incentives, a proposed residential project shall consist of five or more dwellings and must provide at least one of the following:

- Ten (10) percent of the total number of proposed dwellings for lower-income households.
- Five (5) percent of the total number of proposed dwellings for very low-income households. Fifty (50) percent of the total number of proposed dwellings is for residents with incomes between 80% and 120% of the Riverside County AMI for a family of four.

The density bonus provided to developers who incorporate affordable housing will allow them to construct 25% more residential dwelling units than normally allowed by the zoning district and General Plan designation applicable to the parcel.

On October 15, 2013, the City amended its density bonus ordinance as required by Action 3.1 of the 2008-2014 Housing Plan to reduce the number of affordable units required to qualify for a density bonus and to allow up three incentives and concessions to be awarded to qualified projects. A developer can receive incentives or concessions based

on the proportion of affordable units for target groups. Developers may also seek a waiver or modification of development standards that have the effect of precluding the construction of a housing development meeting the density bonus criteria. The developer must show that the waiver of modification is necessary to make the housing units economically feasible.

Incentives or concessions may include, but are not limited to, the modification of development standards such as a reduction in setback and square footage requirements, height limits, and/or parking requirements.

6.1.6 - Secondary Dwelling Unit Requirements

In response to State mandated requirements and local needs, the City of Murrieta allows for the development of attached secondary dwelling units in specified Single-Family residential zoning districts. Prior to July 1, 2003, secondary units required the approval of a Conditional Use Permit. For applications received after July 1, 2003, State law requires that secondary units must be considered a ministerial action without discretionary review or public hearing. Secondary units shall have a minimum area of the underlying zoning district and the parcel shall be developed with only one existing owner occupied single-family detached main dwelling unit. Only one secondary unit is allowed on a single-family parcel. Previously, the City's second unit ordinance required a proposed second unit to share a common wall with the main structure and to have separate kitchen, bathroom and parking facilities. On October 15, 2013, the City amended its second unit ordinance as required by Action 3.4 of the 2008-2014 Housing Plan to ensure that the ordinance is consistent with State law, and specifically to remove the requirement that second units may only be constructed attached to the main dwelling unit on-site.

6.1.7 - Environmental Review (CEQA)

The environmental review requirements of the California Environmental Quality Act (CEQA) are perhaps the most potentially significant government regulation that constrains new housing development. The key elements of CEQA review can affect the affordability of new housing development by extending the time frame for completing the project review, plus the direct costs to prepare the necessary technical studies of potential impacts. The time constraint to new housing development includes mandatory public review and comment periods, delays in preparing the needed technical studies, implementation of required mitigation measures and the potential for post-approval litigation. In addition, technical studies of potential impacts such as traffic, biological resources, air quality, surface runoff water quality, archaeological resources and noise can cost several thousands of dollars each, the cost of which is passed in the sale price or rental cost.

6.1.8 - Codes and Enforcement

Building and safety codes regulate new construction, alteration, and rehabilitation of buildings and are intended to protect occupants from unnecessary risk of fire, structural collapse, unsanitary conditions, and injury or loss of life. While building and safety codes are adopted for the purposes of preserving public health and safety, and ensuring the construction of safe and decent housing, they have the potential to increase the cost of housing construction and/or maintenance. The City of Murrieta's building codes are

based on regulations necessary to protect the public health, safety and welfare of its residents.

The City has adopted into its Codes and Ordinances the 2010 California Building, Plumbing, Mechanical, Fire and Electrical Codes. These Codes establish construction standards for all residential buildings. Enforcement of building code standards does not constrain the production or improvement of housing in Murrieta, but instead serves to maintain the safety and condition of the City's neighborhoods. No local amendments to the Building Code have been adopted.

6.1.9 - On- and Off-Site Improvements

Development in Murrieta requires site improvements that vary by size and location. These improvements may include, but are not limited to, reservation of sites for public parks and trails, landscaping, irrigation, exterior lighting, storm water drainage, streets and roads and vehicle and pedestrian access including curb cuts. Site improvements are required to ensure that there is adequate structure and access to a site. Site improvements also help in making the project more compatible with surrounding neighborhoods.

On- and off-site improvements are generally provided directly by developers when building a new subdivision and are regulated by the Subdivision Ordinance (Title 16) of the Municipal Code. Specifically, Chapter 16.108 specifies the improvement requirements to be performed and fees to be collected prior to approval of the final map. Typical requirements include:

- City standard street widths (curb-to-curb):
    - Private Residential Road – 36-40 feet;
    - Local Street – 40 feet;
    - Collector Street – 44 feet;
    - Secondary Street – 64 feet;
    - Major Arterial– 86 feet.
- Streetlights and street trees
- Drainage and water system facilities
- Traffic Signals

Private residential roads and local street classification are the typical requirement for housing development in the City. Most of the City's on- and off-site improvements are provided through the payment of fees, which have been accounted for under development fees. Outside of subdivision development, new development under established zones pays its prorated share for on/off-site improvements, if found to be required, as a part of the standard fee schedule.

The City recognizes that improvements can create barriers to the development of affordable housing. When possible, the City has indicated that they will use grant money or other available funding, when available, to offset the cost of on- and off-site improvements in order to assist affordable housing developers in the production of units. In 2007, with the development of the Monte Vista Apartments, the City was able to complete the street, curb, gutter and sidewalk upgrades required to complete the complex. In completing the required improvements for Monte Vista, the City

contributed $250,000 toward the development of the project. Additionally, through its density bonus ordinance (Action 3.1 of the Housing Plan) the City will continue to provide incentives, such as assistance with on- and off-site improvements whenever possible.

6.1.10 - Fees and Exactions

The City and other agencies charge various fees to cover the cost of processing development permits and providing local services. These fees help ensure quality development and the provision of adequate public services. In addition, developer fees and exactions imposed on new development can help to minimize impacts on existing infrastructure and enable required upgrades of infrastructure consistent with demands of the new development. State law requires that these fees be reasonably related to the mitigation of the identified impact, and that they be proportionate to the extent of impact associated with any given development project. These development fees are typically passed on to renters and homeowners in the cost of housing, and thus affect housing affordability.

The City's Planning Department fees Schedule are outlined in Table 6-4. City fees are comparable to other local jurisdictions such as the City of Temecula and the County of Riverside. In comparison to the fees reported in the 2008-2014 Housing Element, the City's updated fee schedule shows that a number of the planning related fees have been reduced. The City is aware that fees can pose as a potential constraint to the development of affordable housing, and closely monitors and reviews its fees, making reductions whenever feasible.

Table 6-4: Development Services / Planning Fee Schedule 2009-2010

Application Type	Set Fee	Actual Cost / Deposit
Annexations		$10,000.00
Addressing / Street Names		$477.00
Appeals	$1,000.00	
City Attorney		Reimburse City Costs
Conditional Use Permit (Major)		$6,054.00
Conditional Use Permit (Minor)		$3,805.00
Development Agreement, Master Development Plan		$15,000.00
Development Code Amendment		$10,000.00
Development Plan Permits (Administrative; Director's Hearing)		$5,104.00
Development Plan Permit (Planning Commission)		$14,781.00
Environmental Assessment; Exemption; Negative Declaration; MND; Mitigation Monitoring; HANS Determination.		$4,910.00
Environmental Impact Report Processing		$15,000.00
Extension of Time		$1,623.00
General Plan Amendment		$10,000.00
Development Review Committee		$1,671.00
Landscape Inspection	Cost of consultant	
Landscape Plan Check	Cost of consultant	
Large Family Day Care		$715.00
Parcel Merger of Revision		$7,797.00
Phasing Plan		$4,243.00
Pre Application Review		$1,000.00
Public Hearing Charge (4 hours)	$776.60	
Public Hearing Noticing; Publication; Mailing		$107-332.00
Sign Permit		$53.00
Sign Program		$938.00
Specific Plan		$20,000.00
Specific Plan Amendment / Substantial Conformance		$10,000.00
Substantial Conformance or Revised Permit		$3,065.00
Temporary Use		$427.00
Tentative Parcel Map or Tract Map		$7,126.00
Variance (Minor)		$1,477.00
Variance (Major)		$2,971.00
Vesting Tentative Parcel Map or Tract Map		$5,346.00
Zone Change		$10,000.00
Zoning Letter; Zoning Clearance; Special Research	$143.00	

Source: City of Murrieta Planning Department, 2012

6.1.10.A - Development Fees for Residential Projects

In addition to the fees identified in the fee schedule, the City is able to anticipate on average the typical fees that will be charged for a single-family home and a multifamily unit. Table 6-5 provides the average per unit fees that are charged by the City for new residential development. Of the fees a developer will incur these fees will vary depending on the jurisdiction.

Table 6-5: Typical Plan Check Fees for Residential Projects

Fees	Single-Family	Multi-Family (per unit)
Development Plan Permit	$5,104	$15
Development Fees	$1,800	$229
Building Inspection Fees	N/A	$219
Landscape Plan Check	$825	$28
Landscape Inspection	$375	$2
Initial Environmental Study	N/A	$10
TOTAL	**$8,104**	**$503**

Source: City of Murrieta Planning Department, 2012

On average for a single-family unit a developer will pay $8,104 in plan check fees to complete the necessary plan checks and inspections required by the City. In comparison a developer will pay on average $503 per unit for a multifamily unit. The cost for each multifamily unit was calculated for a 50 unit project. For the entire multifamily residential project, a developer would pay approximately $25,105 in fees. In comparison to other jurisdictions in the surrounding area, such as Temecula, the City's fees are comparable, as the City has worked hard to reduce the fees associated with residential development charged. In addition to offering lower base fees, the City also attempts to provide other financial incentives, such as land write downs. Historically, the City has purchased land for the purpose of collaborating with affordable housing developer to off-set the high cost of land, which is typically viewed as one of the most significant cost (and consequently a barrier) to the development of affordable units.

6.1.10.B - City-based Development Impact Fees

Once a project has completed the plan check phase, the City will assess development impact fees that are typically paid when the applicant applies for development permits. Development Impact Fees are charged to offset the cost of installing necessary facilities and infrastructure to serve the needs of new development. A discussion of the anticipated fees will, however, usually occur in the planning process. The City of Murrieta's Development Impact Fees are allocated to law enforcement, fire suppression, streets and bridges, traffic signals, freeway access, storm drainage, general government, public libraries and meeting spaces, aquatics facilities, park lands and park facilities, and the purchase of public open space. Impact fees are another source of expense to developers and can act as a constraint to the supply of affordable housing. Table 6-6, provides the average fee charged for public services for both a single-family and multifamily unit.

Table 6-6: Development Impact Fees

Fees	Single-Family	Multifamily
Police	$ 231.57/unit	$ 240.06/unit
Fire	$ 668.31/unit	$ 988.44/unit
Parks	$3,828.92/unit	$ 2,412.23/unit
Streets & Minor Bridges	$ 782.09/unit	$ 497.05/unit
Traffic Signals	$ 133.33/unit	$ 82.90/unit
Storm Drainage	$ 1,530.49/unit	$ 457.71/unit
General Facilities	$ 269.49/unit	$ 269.49/unit
Bridge/Freeway/Ramps	$ 1,902.47/unit	$ 1,208.93/unit
Open Space Acquisition	$ 529.33/unit	$ 103.89/unit
Community Center	$ 210.61/unit	$ 133.34/unit
Public Library	$ 210.60/unit	$ 133.33/unit
TOTAL	**$10,297.21/unit**	**$6,527.37/unit**

Source: City of Murrieta Planning Department, 2012

The development impact fees charged by the City have not increased from the fees reported in the 2008-2014 Housing Element. In comparison to other jurisdictions in the surrounding area, the City's fees are comparable for both single-family and multifamily units. While these fees should not constrain development, the City does attempt to assist affordable housing developments by completing infrastructure improvements when funds are available. The types of improvements, the City can or has assisted with historically include parks, open space acquisition, streets, signals and storm drainage.

6.1.10.C - Countywide Development Fees

In addition to the fees shown above, Table 6-7 provides additional development impact fees that are not controlled by the City, but may apply to development. These fees include:

- the Riverside County Multiple Species Habitat Conservation Program (MSHCP), which is a criteria-driven Habitat Conservation Plan intended to create a network of permanent open space;
- Transportation Uniform Mitigation Fee (TUMF) fees, intended to fund the mitigation of cumulative regional transportation impacts resulting from future development;
- Stevens Kangaroo Rat Mitigation Fees, to replace and preserve habitat for the species that may be affected by new development;
- School Impact Fees, which are determined by district to maintain healthy schools throughout the County; and

- Area Wide Drainage Fees, which were established to maintain and upgrade the City's drainage system as new development occurs.

Table 6-7: Countywide Development Fees

Fee Type	Fee Amount	
Western Riverside County Multiple Species Habitat Conservation Program (MSHCP) Fees	Less than 8.1 dwelling units per acre = $1,938.00 per dwelling unit Between 8.1 and 14.0 dwelling units per acre = $1,241.00 per dwelling unit Greater than 14.0 dwelling units per acre = $1,008.00 per dwelling unit	
Transportation Uniform Mitigation Fee (TUMF)	Single-Family Residential = $9,812.00 per single-family residential unit Multifamily Residential = $6,890.00 per multifamily residential unit	
Kangaroo Rat Mitigation Fee	< 0.5 ac. = $250 / lot > 0.5 ac. = $500 / acre	
School Impact Fees	$3.80 per square foot for each single-family and multiple-family dwelling	
Area Wide Drainage Fee	Lots < 1 acre Murrieta Valley = $4,139.00 per acre Temecula Valley = $2,291.00 per acre Santa Gertrudis Valley = $1,179.00 per acre Warm Springs Valley = $677.00 per acre	Lots > 1 acre Murrieta Valley = $4,139.00 per lot Temecula Valley = $2,291.00 per lot Santa Gertrudis Valley = $1,179.00 per lot Warm Springs Valley = $677.00 per lot

Source: City of Murrieta Mitigation Fee Schedule 2012

The fees identified in Table 6-7 were not established by the City of Murrieta, but rather, for example, by the Riverside County Board of Supervisors or the school district. The City does not have the authority to waive or modified these fees; however, these fees are often examined and/or waived for affordable housing developments. For example, TUMP fees are not applied to affordable housing complexes and kangaroo rat fees are reduced for multifamily developments. These fees should not be viewed as a constraint because they are required for all new development and are often not applied to affordable development. In addition, as mentioned previously, the City does attempt to help lower development cost by assisting with infrastructure improvements and by purchasing land. The development impact fees charged by the County, with the exception of the TUMF, have not increased from the fees reported in the 2008-2014 Housing Element

6.1.10.D - Processing and Permit Procedures

Development review and permit processing are necessary steps to ensure that residential construction proceeds in an orderly manner. However, the time and cost of permit processing and review can be a constraint to housing development if the agency does not complete its review in a timely manner or otherwise delays the start of construction. In general the City's processing times are consistent with the time frames for processing applications in nearby Temecula and Riverside County. The City understands that a lengthy processing time frame can increase design, financing and other costs, which, in turn, impact the final price of housing. Consequently, the City has worked to improve their permitting process by providing public counter services Monday through Friday in addition to establishing a streamlined permit processing system. The reduction in processing time results in a shorter holding time for the developer, which translates to cost savings that should be reflected in the prices or rents for the residential units. The City will continue to assess policies,

procedures, and fees to remove unnecessary delays or expenses to projects that may help to lower housing costs.

6.1.10.E - Permit Processing for Single-Family Construction

The permitting approval process for a residential project depends on the number of units requested by the applicant. If a property owner applies for permits to construct a Single-Family home the permitting process on average takes two to eight weeks. Once the applicant submits their plans and plan check fees the planning department begins their review for completeness. The more information an applicant provides and the quicker they correct any revisions on their plans, the shorter the permit processing time.

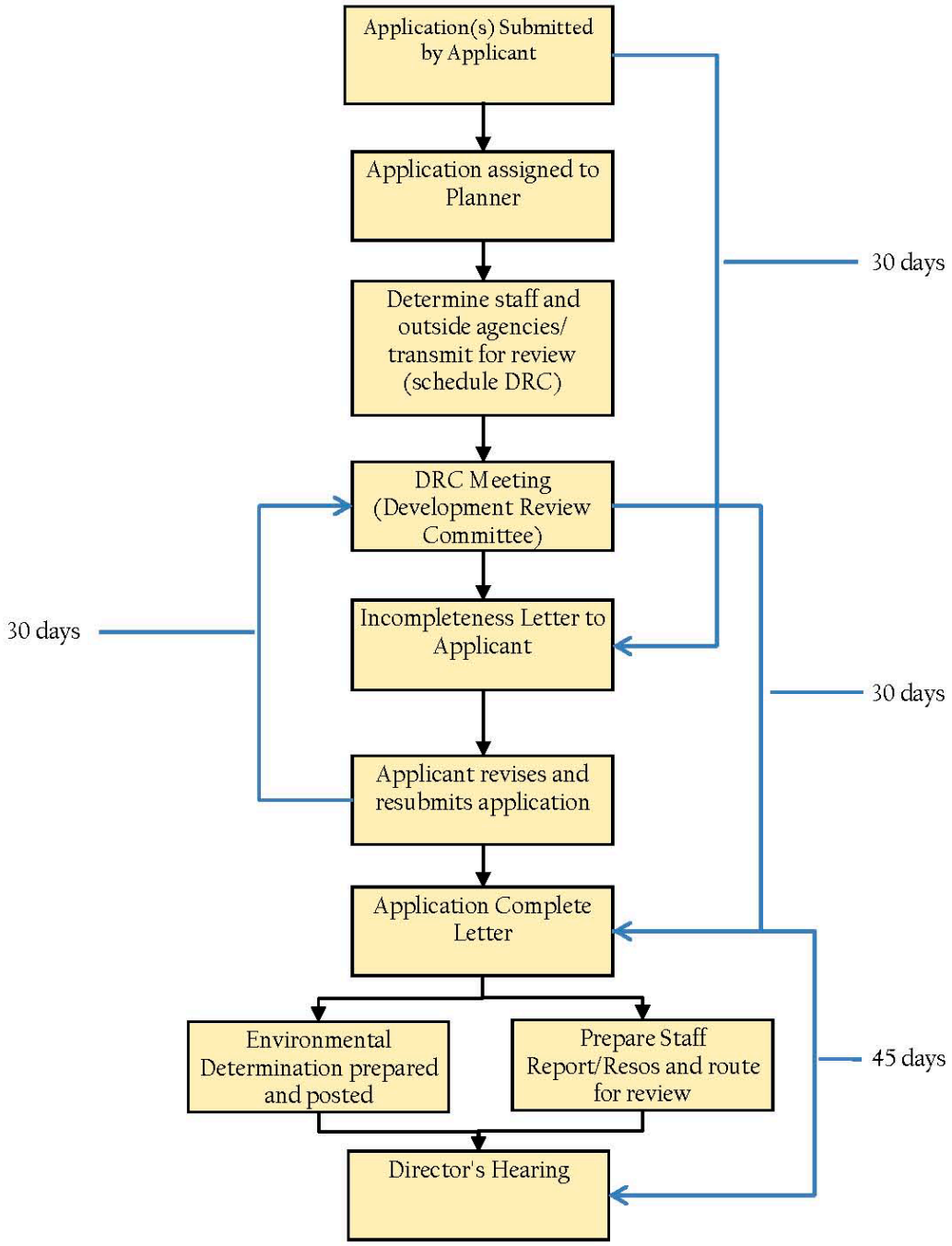
6.1.10.F - Permit Processing for Multifamily Construction

For a multifamily residential project the permitting procedure can be more complex and consequently can result in longer and more variable processing times. The City currently has two different processes for multifamily developments; one for projects with four or fewer units and another for projects with four or more. For projects with four or fewer units the plans are approved through a process known as Administrative Development Plan Review. Once the applicant submits their application and plans, an appointment it scheduled with the City's Development Review Committee (DRC) which is composed of City Staff. The DRC reviews the plans for completeness as well as assessing comments made by the various other City departments including, fire, public works and building. Once the plans have been approved by the DRC the City notifies the applicant that the project will be approved by the Planning Director. The Administrative Development Review Process typically takes between 8 to 12 weeks however the processing time is often dependent on how efficient the applicant is at revising and resubmitting plans if corrections are required.

For a multifamily development with four or more units the development review process requires approval by the Planning Commission. Upon submitting an application and development plans, the project is reviewed by the DRC initially for completeness and then to determine if any conditions of approval including required improvements are necessary to complete the project. Conditions of approval typically protect the health, safety and welfare of the public and ensure a project's consistency with established architectural design guidelines. Upon completing their review the DRC's conditions of approval are sent to the applicant. At the applicant's request a meeting can be scheduled to discuss the conditions of approval if necessary. If the applicant understands and accepts the DRC's findings and conditions the project is sent as a public hearing item before the Planning Commission. Findings and conditions do not exceed the limits and requirements of the State law. Any finding or conditions are provided primarily to ensure that the project is consistent with the City's General Plan, the Zoning Code and Health and Safety codes, Typical findings for a multifamily housing project includes analysis of street improvements, fire suppression, and water quality. In most cases a project would then be approved by the Planning Commission and permits would be issued soon after. The processing time for a multifamily development with four or more units typically takes between 14 to 18 weeks. Similar to the process for the projects with four or fewer units, the

processing time is often dependent on how efficient the applicant is at revising and resubmitting plans if corrections are required.

Development Review Process for Multi-family Project



6.1.11 - Variance

In some instances, a property owner or applicant may apply for a variance allowing for reduced setbacks, increased building height or a reduction in other development standards. The purpose of the variance is to provide a discretionary permit process that allows for deviations from applicable standards of the Zoning Code, provided very specific findings can be made pursuant to State law. The Planning Commission may approve or deny the variance based on the determination that there are compelling physical constraints which affect the ability of the property to meet the zoning requirements. The decision of the Planning Commission is final unless appealed to the City Council. The variance procedure does not burden housing development because the City's discretion in granting variances is tied to the limitations established by State law. A variance may take four to eight weeks for review, and an additional four weeks if appealed to City Council

6.2 - Housing for Disabled Persons

State law requires localities to analyze potential and actual constraints upon housing for persons with disabilities, demonstrate efforts to remove governmental constraints, and include programs to accommodate housing designed for people with disabilities. The City has no special zoning or land use restrictions including minimum distance requirements that regulate the location of housing for persons with disabilities. There are no requirements, standards or regulations that present constraints to the development of housing for disabled individuals. The City has adopted "Universal Design" standards for new residential construction, which provides for the features intended to assist disabled or frail persons in remaining in their own homes. These regulations require 15% of all units to have universal design features, such as first floor accessibility and cooking facilities, and wider door and hallways.

In accordance with State law, Murrieta permits State-licensed residential care facilities serving six or fewer persons in all of its residential zoning districts. Residential care facilities serving seven or more persons are a conditional use in all residential zoning districts. To accommodate disabled persons in public facilities, the City defers to Title 24 of the California Handicap Accessibility Code.

The City's housing rehabilitation programs are designed to meet the needs of persons with disabilities who may require wheelchair ramps, wider doors, grab bars, and lower counter tops. These types of improvements are eligible under the City's housing rehabilitation loan programs.

6.2.1 - Americans with Disabilities Act

Building codes require that new residential construction and rehabilitation construction comply with the Federal Americans with Disabilities Act (ADA). ADA provisions include requirements for a minimum percentage of units in new development to be fully accessible to the physically disabled. Unlike the Uniform Building Code, enforcement of ADA requirements is not at the discretion of the City, but is mandated under Federal law. Compliance with building codes and ADA increases the cost of housing production, and can potentially delay the rehabilitation of older properties required to be brought up to current standards. However, these regulations provide minimum standards that must be complied with in order to ensure the development of safe and accessible housing.

6.2.2 - Reasonable Accommodation

The Fair Housing Act requires that cities and counties provide reasonable accommodation to rules, policies, practices, and procedures where such accommodation may be necessary to afford individuals with disabilities equal opportunity to housing. The City's Senior Residential Overlay Zoning District and Universal Design requirements help facilitate reasonable accommodation by creating a process for making requests for reasonable accommodation to land use and zoning decisions and procedures regulating site locations, funding, development and use of housing for the elderly with disabilities. On October 15, 2013, procedures for reasonable accommodation to assist persons with a disability were adopted by the Murrieta City Council. Throughout the planning period Staff will provide information for residents at City Hall and the City website.

6.3 - Non-Governmental Constraints

The production and availability of housing may be constrained both by government regulations and by non-governmental factors, such as natural hazards, construction costs, global climate change and interest rates on home mortgages.

6.3.1 - Natural Hazards

Natural hazards include geologic and seismic conditions that provide the greatest threat to the built environment. The City has identified areas where land development should be carefully controlled. The following hazards may impact future development of residential units in the City.

6.3.1.A - Seismic Hazards

Two active faults are located within the City of Murrieta. The Elsinore Fault passes through the City to the west of Interstate 15 and the Wildomar Fault runs northwest/southeast through the City west of Interstate 15. Portions of these areas, especially along the Wildomar Fault, are subject to liquefaction. Liquefaction occurs when a mass of soil collapses from a sudden loss of cohesion due to an earth tremor or to a sudden increase in groundwater from an external source. The greatest potential danger due to earthquakes and liquefaction is the collapse of older residential units constructed from un-reinforced building materials.

The Alquist-Priolo Earthquake Fault Zoning Act of 1972 is used in California to prevent the construction of buildings used for human occupancy on the surface trace of active faults. The Act prohibits new construction of houses within these zones unless a comprehensive geologic investigation shows that the fault does not pose a hazard to the proposed structure. Areas along the Wildomar Fault are within a "Special Studies Zone" as designated under the Act, which would affect housing production.

6.3.1.B - Flood Hazards

Many areas of the City are within the 100-year flood zones, and there has been a history of severe flooding associated with overflow from Murrieta Creek and its tributaries. The flood zones in the City are primarily located between Jefferson Avenue and Hayes Avenue along Murrieta Creek and portions of Warm Springs

Creek. Portions of the City are subject to potential dam inundation zones associated with Lake Skinner and Diamond Valley Lake.

6.3.1.C - Wild Fires

Undeveloped hillside areas in and adjacent to the City can present a serious hazard due to the potential for large-scale wild fires. The threat is particularly significant during dry summer months and when there are strong "Santa Ana" winds. To mitigate the threat of wild fires, the Murrieta Fire Department, along with the California Department of Forestry, has initiated special response protocols to prevent and combat wild fires.

6.3.1.D - Hazardous Waste

Murrieta has a number of businesses that use hazardous materials or generate hazardous waste. There are also a numbers of sites in the City which have contamination associated with underground tanks used to store petroleum products. These sites are located in commercial and industrial zones. The City does not consider hazardous waste an overwhelming concern or constraint to the development of housing.

6.3.2 - Infrastructure Constraints

Site improvements and property dedications are important components of new development and contribute to the creation of decent and affordable housing. Residential development in Perris requires site improvements that vary by size and location. These improvements may include, but are not limited to:

- Separate and adequate distribution lines for domestic water supply
- Sewage collecting system where main lines of an adequate disposal system are available
- Adequate grading and surfacing of streets, highways, and alleys
- Concrete curbs and gutters
- Concrete sidewalks
- Fire hydrants at locations designated by the City engineer and Fire Department
- Traffic control devices
- Necessary barricades and safety devices
- Utility facilities including, but not limited to, wires, cables and ducts for distributing electricity, communication, and cable television
- Fees for, or dedication of, parks and recreation facilities
- Roadway widening
- Street lighting
- Median islands

Site improvements are required to ensure that there is adequate infrastructure for and access to a site. Site improvements also help in making the project more compatible with surrounding neighborhoods; however, these site improvements can act as a constraint on the development of housing due to the significant commitment in cost for the developer, which in turn this cost is carried over into the purchase price of the home by the developer. To encourage the development of affordable housing many of these requirements and dedications can be waived by the City to help mitigate cost impacts. The City has also historically completed road, curb and

sewer improvements to allow an affordable housing developer to more easily development their project. In addition, Murrieta also attempts to offset the overall cost of development by purchasing land and donating it for an affordable housing project, which is typically a significant cost barrier when combined with infrastructure and construction costs. A brief summary of the principal infrastructure systems serving the City follows:

6.3.2.A - Water

Water is supplied to the City by the four water districts: Western Municipal Water District, Eastern Municipal Water District, Rancho California Water District, and Elsinore Valley Municipal Water District. Each district determines residential water backup charges, which are assessed on a sliding scale, according to zone. A water deposit and water meter fees are charged upon application for a residential building permit. It is difficult to anticipate the fees associated with water infrastructure as the cost varies greatly depending on the size of the project and the location of the site in the City. Table 6-8 illustrates the fees for each of the four districts. The availability of water in Murrieta is largely reflective of the resources available in the region as a whole including western Riverside County. The City has evaluated its available water resources as part of the General Plan 2035 and has established mitigation measures to ensure that adequate water is available for existing and future development.

Table 6-8 shows fees charged by the water districts to construct new infrastructure in rural areas. The fees have not changed since the 2008-2014 Housing Element was adopted. Furthermore, the housing opportunity sites, identified by the City, to accommodate their 2014-2021 RHNA are situated in areas where existing infrastructure is available to serve new development.

Table 6-8: Water District Fees

Water Provider	Primary Fee	Additional Fees
Eastern Murrieta Water District	$300/unit+$234 (for 5/8"line)+sewer treatment plant capacity; sewer financial participation, water financial participation	If more than 1 bedroom cost is 1 EDU* per Bedroom ($330 * # of bedrooms) 1 bedroom is calculated at .85*1 EDU. *EDU = Equivalent Dwelling Unit
Rancho California Water District New service installation (meter installation deposit and capacity fee)	Plan check & inspection = $6,000 for 1st 1,000 linear feet; $4/linear feet thereafter (deposit). $125/page of plans for as built/archive. ¾ inch line $1,685 drop in installation; $5,287 full installation in Rancho Div. ¾ inch line $2,508 drop in installation; $6,110 full installation Santa Rosa Div.	Plan check & inspection = $6,000 for 1st 1,000 linear feet; $4/linear feet thereafter (deposit). Detector check, submittal, plan check, and inspection = $4,000 $125/page of plans for as built/archive. Drop in installation Rancho: 1" meter $2,774 1 ½" meter $5,479 Full installation in Rancho: 1" meter $6,291 1 ½" meter $9,035 Drop in installation Santa Rosa: 1" meter $4,146 1 ½" meter $8,220 Full installation Santa Rosa: 1" meter $ 7,663 1 ½" meter $11,776
Western Municipal Water District	Meter Service Installation = $2,100 Drop in fee/¾" meter $ 380 DIF/meter $1,932 DIF/gross acre $2,045 Conservation/meter $50 Annexation MWD/acre $3,671 Annexation processing fee $500 Backflow inspection/meter $ 35 Plan check deposit = 5% of project cost Inspection deposit = quote based on quantity of pipe installed & various other factors. Mapping & recorded docs. = quote	Meter Service Installation = $2,100 Drop in fee/1" meter $ 425 Drop in fee/1 ½" meter $ 640 Drop in fee/2" meter $ 790 DIF/gross acre $2,045 Conservation/meter $ 50 Annexation MWD/acre $3,671 Annexation processing fee $ 500 Backflow inspection/meter $ 35 Plan check deposit = 5% of project cost Inspection deposit = quote based on quantity of pipe installed & various other factors. Mapping & recorded docs. = quote
Rancho California-Santa Rosa Water Reclamation/Western Municipal Water District	Wastewater/Sewer Connection Fees = $5,583 per *EDU *EDU = Equivalent Dwelling Unit	$5,583 x .90 for projects with individual laundry $5,583 x .85 for projects with common laundry facilities.

Source: City of Murrieta, 2012.

6.3.2.B - Sewer

The City's sewer system is maintained by the above mentioned water districts. The City has identified that there is existing sewer capacity to accommodate the development of residential units as allocated by the 2014-2021 RHNA. Recently, the Western Municipal Water District has initiated the removal of septic tanks and installed a new sewer system in Historic Downtown Murrieta.

6.3.2.C - Flood Control

The City of Murrieta is divided into four drainage areas: Murrieta Valley; Temecula Valley; Santa Gertrudis Valley; and Warm Springs Valley. A drainage fee is determined by the size of the development based on acreage and which drainage area the development is located in. Fee amounts are shown in Table 6-8. The drainage fee is paid prior to final map approval, or if associated with a development plan, prior to the issuance of a building permit.

6.3.3 - Construction Costs

Construction costs are the total costs to developers exclusive of profit, but including fees, materials, labor and financing. Construction costs for housing can vary significantly, depending on the type of housing, such as single-family detached homes, townhomes, and multiple-family apartments. However, even within a particular building type, construction costs vary by unit size and amenities. Furthermore, neighborhood resistance to some developments lengthens development time, driving up the holding costs. The difficulty of developing awkward infill sites can also add to costs. The permitted residential uses within the RR, ER, and SF residential zoning districts are primarily low-density single-family detached units. Development Plan approval for higher density development may also add to costs.

The cost of labor is based on a number of factors, including housing demand, the number of contractors in an area and the unionization of workers, but it is generally two to three times the cost of materials. Thus, the cost of labor represents an estimated 17% to 20% of the cost of building a unit, which is a substantial portion of the overall cost of construction.[4]

In the State of California, all projects utilizing public funds must pay prevailing wages to all workers employed on the project. This includes any residential or commercial project that is funded federal funds or assisted residential projects controlled or carried out by an awarding body. The prevailing wage rate is the basic hourly rate paid on publicly funded projects to a majority of workers engaged in a particular craft, classification, or type of work within the locality and in the nearest labor market area.

Twice a year, prevailing wage rates are determined by the director of the California Department of Industrial Relations. A prevailing wage ensures that the ability to get a publicly funded contract is not based on paying lower wage rates than a competitor, and requires that all bidders use the same wage rates when bidding on a publicly funded

[4] International Code Council, 2012.

project. The California Department of Industrial Relations provides links to the current prevailing wages for a journeyman craft or classification for each county in California. Prevailing wages may constrain construction of affordable housing because they are often higher than normal wages.[5]

6.3.3.A - International Code Council

Residential construction cost estimates established by the International Code Council (ICC) in fall 2012 indicate average costs of labor and materials between $96.58 and $144.89 per square foot for multifamily residential depending on the type of construction.[6] Single-family residential costs range between $105.93 and $136.37 per square foot, depending on the type of construction. Construction costs may vary based on the type of material used, location of development, structural features present, and other factors.

The data indicates that construction costs in the Murrieta vicinity can constitute approximately 40% of the cost of a single-family detached housing unit. These figures are even more noteworthy considering that the cost of raw land constitutes only 4 to 14% of the cost of a housing unit. Typically, in the private sector market, the development of residential units is a business and investment venture. Therefore, developers seek the greatest return for their investment. As with most businesses, a constraining factor in the area of profitability continues to be the market place where developers sell their products. To a great extent, the market place sets the upper end of the profit margin with overhead costs for construction constituting the lower parameter of profit.

The construction cost of housing affects the affordability of new housing and can be a constraint to the creation of affordable housing in the City and greater Riverside County region. Particularly with the tightening of mortgage lending standards and increases in current rates, homebuilders may be slowing down on the construction of new homes, which could potentially affect the provision of affordable housing. A reduction in construction costs can be brought about in several ways. One such method involves a reduction in amenities and quality of building materials in new homes (still above the minimum acceptability for health, safety and adequate performance), which may result in lower sales prices. State Housing Law provides that local building departments can authorize the use of materials and construction methods if the proposed design is found to be satisfactory and the materials or methods are at least equivalent to that prescribed by the applicable State building codes.

6.3.4 - Land Costs

Residential land prices contribute significantly to the cost of new housing. Location factors such as proper zoning, proximity to freeway access, public facilities, and intangible factors such as image and quality of life contribute to the demand and price of land. As fewer parcels become available for new development, the price for land increases.

[5] California Department of Industrial Relations
[6] International Code Council, 2012.

Due to the current economic downtown there is variation in land prices throughout the region. In general, land prices in Riverside County are more affordable than the Los Angeles, Orange, and San Diego markets; in fact, the lack of inexpensive residential land in Los Angeles, Orange, and San Diego Counties was a major impetus for the development of the Inland Empire, including Murrieta. Land prices along with home prices in Murrieta have become more affordable; however property acquisition remains one of the largest barriers to affordable housing development. Land cost may vary depending on whether the site is vacant or has an existing use that must be removed. Similarly, site constraints such as environmental issues (e.g. steep slopes, soil stability, seismic hazards or flooding) can also be factored into the cost of land.

While the City cannot control or influence the cost of land, Staff has indentified in the Housing Plan that the City will purchase properties in order to facilitate the development of affordable housing. The City spent $4.8 million on two properties totaling 8 acres during the 2008-2014 planning period, that are intended for the development of affordable housing. A developer has already been identified for one of the parcels while the other may be developed during the current planning period. While the elimination of the Redevelopment Agency creates new barriers, the City will continue to identify and purchase properties when funding is available to further reduce land cost as a barrier to the development of affordable housing.

6.3.5 - Financing

The availability of financing affects a resident's ability to purchase or improve a home and the cost of borrowing money for residential development is incorporated directly into the sales price or rent. Interest rates are determined by national policies and economic conditions and there is very little a local government can do to affect these rates. In December 2012, the posted interest rate on resale single-family homes was 3.75% on a 30-year fixed-rate loan with a 20% down payment.[7]

First-time homebuyers tend to be the group most directly impacted by financing requirements. Mortgage interest rates for new home purchases ranged from 3% to 5% for a fixed rate 30-year loan in 2012. Lower initial rates may be available with Graduated Payment Mortgages (GPM), Adjustable Rate Mortgages (ARM), and Buy-Down Mortgages.[8] Although interest rates are currently low, they can change significantly and substantially impact the affordability of the housing stock. Given the economic downturn in 2008, interest rates have been lowered, but fewer first-time homebuyers are being approved for 30 year mortgages.

Interest rates in 2012 are at the lowest level recorded in year, and are not a direct constraint to affordable housing; however if a household only qualifies for a higher interest rate, it could pose a constraint to lower income families. A change by one percentage point can make a monthly payment out of reach for many lower income households. Financing for long term mortgages is generally available in Murrieta, subject to normal underwriting standards.

[7] U.S. Federal Reserve
[8] U.S. Federal Reserve

A more critical impediment to homeownership involves both the affordability of the housing stock and the ability of potential buyers to fulfill down payment requirements. Typically, conventional home loans will require 80% loan-to-value and represents the largest constraint to homebuyers. Other programs, such as those for first-time homebuyers, can find down payment requirements between 5% and 20%. Also, the availability of financing for developers poses a constraint on development outside of the City's control.

The greatest impediment to home ownership, however, is credit worthiness. According to the Federal Housing Authority, lenders consider a person's debt-to-income ratio, cash available for down-payment, and credit history, when determining a maximum loan amount. Many financial institutions are willing to significantly decrease down-payment requirements and increase loan amounts to persons with good credit rating.

Persons with poor credit ratings may be forced to accept a higher interest rate or a loan amount insufficient to purchase a house. Poor credit rating can be especially damaging to lower-income residents, who have fewer financial resources with which to qualify for a loan. The FHA is generally more flexible than conventional lenders in its qualifying guidelines and allows many residents to re-establish a good credit history.

Under the Home Mortgage Disclosure Act (HMDA), lending institutions must disclose information on the disposition of loan applications by the income, gender, and race of the applicants. This applies to all loan applications for home purchases and improvements, whether financed at market rate or through government assistance. HMDA data can be used to evaluate lender compliance with anti-discrimination laws and other consumer protection laws. The anti-discrimination laws include the Equal Credit Opportunity Act (ECOA) and the Fair Housing Act (FHA). These laws prohibit discrimination in home mortgage lending, among other things, on several bases such as race, national origin, sex, and age.

Table 6-9 presents the outcome of home purchase loan applications in 2007 by income of the applicants from HMDA data. The data is the most recent data for the Riverside-San Bernardino-Ontario Metropolitan Statistical Area (MSA) and for the purchase of single-family, duplexes, and manufactured homes. Due to changes in lending practices and stricter down payment requirements the overall number of applications dropped substantially in comparison to 2008. It is interesting to note that only 37% of the loan applications were received from above moderate-income households (earning greater than 120% of the AMI). Moderate-income households (80% to 120% of the AMI) and lower-income households (less than 80% of the Riverside AMI) accounted for approximately 38% and 25%, respectively. The average loan origination rate was 55%. Generally it may be assumed that the significant reduction in home prices may have allowed lower and moderate income households an opportunity to buy homes that were previously unaffordable prior to 2008.

Table 6-9: Disposition of Conventional Loan Applications

Applicant Income	Total Applications	Percent Originated[1]	Percent Denied	Percent Other[2]
Lower-Income (<80% AMI)	7,118	59%	18%	23%
Moderate-Income (80-120% AMI)	10,781	37%	9%	54%
Upper-Income(>120% AMI)	10,354	70%	18%	12%
Totals/Averages	**28,253**	**55%**	**15%**	**30%**

Source: Home Mortgage Disclosure Act (HMDA), Reported 2008.

Notes: (1) "Originated" refers to loans approved by the lender and accepted by the applicant.
(2) "Other" includes applications approved but not accepted, files closed for incompleteness, and applications withdrawn.
(3) The total applicants for each income category do not sum to equal the total due to unavailability of income data for some applicants.

6.3.6 - Home Purchase Costs

Another constraint that affects the ability of a person, family, or household to purchase a home is the cost of the house itself and the costs that are associated with the purchase. In 2012, the median sales price of a home was reported to be $244,000.[9] While this price is moderate to low for the southern California region, it often exceeds what is considered affordable to the homebuyer. Other factors in home purchasing can constrain a buyer's ability to qualify for a buyer's loan such as high escrow costs, mortgage processing, title acquisition, realtor fees, etc. Factors such as homeowner associations, increased tax bills due to special assessment districts, and Mello-Roos districts also affect a potential homebuyer's ability to qualify for a loan.

[9] Data Quick, December 2012.

Housing Resources

Section 7

This section summarizes the land, financial, and administrative resources available for the development and preservation of housing in Murrieta. The analysis provided includes an evaluation of the availability of land resources for future housing development; the City's ability to satisfy its share of the region's future housing needs, the financial resources available to support housing activities, and the administrative resources available to assist in implementing the City's housing programs and policies.

7.1 - Regional Housing Needs Allocation (RHNA)

For the 2014-2021 planning period, the City of Murrieta has a RHNA allocation of 1,573 units. This is a substantial decrease from the 2008-2014 allocation of 6,303 units. The RHNA allocation for the 2014-2021 planning period has been divided between four income categories as follows: 395 units for very-low income, 262 units for low income, 289 units for moderate income, and 627 units have been allocated to accommodate the above moderate income category.

Table 7-1: Fair Share Housing Needs 2014-2021

Very Low	Low	Moderate	Above Moderate	Total Adjusted Need
395	262	289	627	1,573

Source: Regional Housing Needs Assessment, SCAG October 2012.

Note: The 8 year planning period extends from January 1, 2014 to September 30, 2021.

7.2 - Zoning Appropriate to Accommodate Lower Income Housing

Density is a critical factor in the development of affordable housing. In theory, maintaining low densities typically increases the cost of construction per unit, while higher density development lowers the per-unit land cost and facilitates construction in an economy of scale. In addition to potential for density bonus provisions, more intense residential development is achieved through a number of mechanisms, including clustering of residential development, and zero lot line development, subject to City development standards. Clustering of housing can produce higher densities on a portion of land while creating space for amenities, and retaining the overall density assignment of the entire property. This method is effective when portions of the property not utilized for residential development can be developed with compatible uses, such as open space/recreation, parks, schools, public facilities, and support commercial. The City's Multiple Family Residential and Mixed Use designations provide the best opportunity for the development of affordable housing.

The State Housing and Community Development Department (HCD) have deemed affordability as correlated with density. Consequently, HCD has established "default densities" that by

definition are considered sufficient to provide market-based incentives for the development of housing for lower-income households. For jurisdictions with a population greater than 25,000, and located within a Metropolitan Statistical Area (MSA) with a population of more than 2 million, the default density is 30 dwelling units per acre (or higher). Murrieta has a population greater than 25,000 and is within the Riverside MSA. Thus, HCD has determined that Murrieta's default density is 30 dwelling units per acre. During the previous planning period the City updated the General Plan and amended the Zoning Code to permit densities up to 30 dwelling units per acre to facilitate the development of a variety of housing opportunities.

Since the year 2000, a number of lower income housing developments have been constructed in the City. Affordable units have been created in the following three zones: Multi-Family 2 (MF-2), Multiple Use-3 (MU-3), and specific plan areas. It is important to note that many of the projects with affordable units have also utilized the City's density bonus incentives. The majority of the affordable units constructed in the City are zoned MF-2, which allows for a density of up to 15-18 dwelling units per acre. A total of three (3) projects with 1,046 units affordable to moderate-income households have been created at this density. The MF-2 zone is valuable in that it allows developers to provide units that are affordable to moderate-income households without requiring them to establish deed restrictions which can be a barrier for some developers. The MU-3 zone which allows up to 18 dwelling units has also facilitated the creation of affordable housing. Five complexes with a total of 245 affordable units with deed restrictions and 770 non deed restricted units have been constructed in the MU-3 zone. In addition to the MU-3 and MF-2 zones, specific plan areas (SP) have also allowed for the development of affordable units. In the Downtown~~Historic~~ Murrieta Specific Plan as well as the Murrieta Highlands Specific Plan, 13 deed restricted units and 183 unrestricted units have been constructed. Table 7-2 provides information about the affordable housing developments in the City that have been constructed since the year 2000.

Table 7-2: Existing Complexes with Affordable Units

Multifamily Complex	Zoning/ Max. Density	Year	Extremely Low	Very Low	Low	Moderate	Above Moderate
Camden Vineyards Total Units = 264 units	MF-2 15-18 du/ac	2001				*270*	
Madison Park Total Units = 284 units	MF-2 15-18 du/ac	2003				*284*	
Crescent Heights Total Units = 184 units	MF-2 15-18 du/ac	2003				*184*	
Eagle Glen Total Units = 320 units	MF-2 15-18 du/ac	2004				*308*	*12*
Reserves at Madison Park Total Units = 248 units	MU-3 18 du/ac	2004		13 (DR)		24 (DR) *211*	
Monte Vista Total Units = 64 units	MU-3 18 du/ac	2005	6 (DR)	46 (DR)	6 (DR)	5 (DR)	
Sonoma at Mapleton Total Units = 193 units	SP Varies	2005				*183*	*10*
Amberwalk Total Units = 111 units	SP Varies	2005		5 (DR)		9 (DR)	*97*
Hilltop at Winchester Total Units = 175 units	MU-3 18 du/ac	2006				*106*	*69*
Grande Isle Senior Apts Total Units = 453 units	MU-3 18 du/ac	2007				*453*	
3rd Street Homes Total Units = 4 Houses	SP Varies	2008			4 (DR)		
Monte Vista II Total Units = 40 units	MU-3 25 du/ac	2013	4 (DR)	24 (DR)	12 (DR)		
Total			10 (DR)	88 (DR)	22 (DR)	38 (DR) ***1,999***	***188***

Note: Italicized numbers indicate units not having a deed restriction.
Abbreviations: MF-2 = MutliFamily-2, MU-3 = Multiple Use-3 and SP refers to a Specific Plan
Source: City of Murrieta, 2012.

Table 7-2, shows that, historically, the City of Murrieta has been successful in the development of affordable housing, including very low- and low-income housing, within its existing zoning designations that allow densities below the required 30 du/ac minimum required by the State. The City recognizes that in rezoning land to allow for higher densities there is even greater potential for the development of affordable units.

The City of Murrieta, like many jurisdictions in western Riverside County, is in a unique situation to be able to provide affordable units in developments that are below the default densities established by the State. The cost of land, materials and development has always been lower than other counties such as Los Angeles, Orange, and San Diego. This, in turn, has resulted in a lower median home price that is typically affordable to low and moderate income families. The City has formed a strong partnership with Affirmed Housing Group (AHG). AHG was established in 1994, and develops and owns affordable apartment communities throughout California. Their current portfolio includes 23 apartment communities with over 2,200 units, and they currently have more than 600 new units in the development pipeline. In 2005, AHG completed the Monte Vista Apartments which includes 64 affordable units and is located on

Jefferson Avenue in Murrieta. In 2011 the City Council approved, Monte Vista II, a 40 unit development that is 100% affordable to lower income households. Monte Vista II held its official opening in February 2013.

In preparation for the development of Monte Vista II, AHG analyzed multiple sites in Downtown Murrieta, in the general vicinity of Jefferson and Juniper, ranging in size from 2 – 6 acres. The letter and pro forma provided in Appendix B illustrates a potential development recently analyzed by AHG. Based on current property values, AHG states that projects can be underwritten at Murrieta's current multifamily zoning (MF-2) density standard of 18 dwelling units per acre, and do not necessarily require the 1.35 density bonus allowable by SB 1818 to be financially viable.

To the extent property values do not increase significantly, AHG also states that the City's existing maximum density of 18 dwelling units per acre will continue to be sufficient to allow for development of affordable apartments, and the available 1.35 density bonus will extend the viability of this density restriction even with moderate increases in property acquisition costs. Significant increases in property costs will likely require an increase in per-unit contribution by the City. For developments on City owned property, affordable developments will remain viable at an 18 dwelling units per acre density.

In the last decade, City Staff has recognized that facilitating higher density developments can benefit both the housing developer and low income families if units are constructed. Consequently, Staff began to encourage developers by offering incentives, in an effort to assist in the development of higher density projects. Staff's efforts were resisted however; as developers expressed that the existing densities (up to 18 units per acre in the MF-2 and MU-3 zones) are conditions that are not only feasible, but economically favorable for them to develop housing. The resistance by developers to the build at densities above 18 dwelling units per acre may be explained by the development history of the City. Murrieta only recently experienced a surge in their total population and is still transitioning from a rural to a suburban community. Unlike many existing, older jurisdictions in more densely populated areas, Murrieta still has vacant land available that is relatively inexpensive by comparison. While the City has continued to plan for the future, by encouraging developers to utilize the existing density bonus ordinance and establishing new higher density zones, it is appropriate to allow the densities of the existing MF-2 and MU-3 zone to be considered in order to accommodate the remaining very low- and low-income RHNA allocation.

7.3 - Availability of Sites for Housing

State law requires that a community provide an adequate number of sites to allow for, and facilitate production of the City's fair share of regional housing. To determine whether the City has sufficient land to accommodate its fair share allocation for each income group, the City must identify "adequate sites." Under State law (California Government Code section 65583 c.l.), adequate sites are those with appropriate zoning and development standards, with services, and facilities, that allow and encourage the development of a variety of housing for all income levels. Land considered suitable for residential development includes:

- Vacant residentially zoned sites;
- Vacant non-residentially zoned sites that allow residential uses (such as mixed-use);

- Underutilized residentially zoned or non-residentially zoned sites that can be rezoned or are capable of being developed at a higher density or with greater intensity;

An important component of the Murrieta Housing Element is the identification of sites and future housing development opportunities in the 2014-2021 planning period. All of the sites identified in the Sites Inventory section are either vacant residentially zoned sites or vacant residentially zoned sites that were recently rezoned to accommodate higher density development. In calculating their total unit capacity an 80% development potential is assumed and applied to the acreage, meaning that for a 5 acre parcel, only 4 acres are considered developable with the remaining acre available for infrastructure, right-of-ways and open space. Additionally, for each parcel with a density provided as a range, the maximum development density was assumed. For example, the Multi-Family 1 designation allows for between 10 and 15 units per acre, meaning that 15 units per acre will be used to determine the total unit capacity. In accordance with the Housing Plan the rezoning of properties identified in the tables below will occur within one to two years of the adoption of the Housing Element.

7.3.1 - Vacant Residentially Zoned Land to Accommodate Moderate and Above Moderate Income Development

Within the sites inventory the City has determined that vacant residential land zoned Single-Family-1 and Single-Family-2 is appropriate to accommodate the remaining RHNA allocation of 627 above moderate units. SF-1 allows for a density between 2.1 to 5 dwelling units per acre and SF-2 allows for between 5.1 and 10 dwelling units an acre. These zones typically allow for lower density development including single-family homes, condominiums, and town homes that would require significant assistance from the City in order to make them affordable to very low and low-income families. The City has identified 76 acres of vacant land zoned SF-1 and 15 acres zoned SF-2. This land at 80 percent development capacity and the maximum allowable densities can accommodate over 425 units.

To address the City's remaining moderate and above moderate income RHNA allocation, the City has identified land zoned Multi-Family 2 and Multiple Use-3; both allow between 15 and 18 dwelling units per acre. The City has identified 30 acres of vacant land zoned MF-2 and 108 acres of vacant land zoned MU-3. If the land zoned MF-2 is developed at 80 percent capacity and the maximum allowable density, approximately 438 units can be accommodated. Vacant land zoned MU-3 was calculated at 40 percent capacity, as allowed by the City's Development Code and the maximum allowable density of 18 units per acre, resulting in a total of 780 units. When combined, the number of units that can be accommodated on vacant land zoned MF-2 and MU-3 total 1,218 units. As these sites were identified in the City's 2008-2014 Housing Resources section, but were not developed during the previous planning period, they will remain as viable sites for the 2014-2021 cycle.

In identifying areas available to accommodate their remaining units, the City wants to ensure that multifamily units are not concentrated in any one area of the City. Consequently, the sites selected are scattered throughout the jurisdiction near existing residential uses or services to support new development. A map showing all vacant residentially zoned sites and a table providing parcel numbers, the area of each site and other development information is provided in Appendix A.

7.3.2 - Vacant Residentially Zoned Land to Accommodate Lower Income Development

To accommodate their lower income remaining 2008-2014 lower income RHNA allocation, the City created a new high density multifamily zone known as the Multi-Family 3 zone (MF-3). A minimum density of 30 dwelling units per acre was established for this zone. The City also created and implemented a new "Transit Oriented Development (TOD) Overlay Program" to provide for and allow a mixture of residential and non-residential development, in close proximity to transit. The area identified permits, by right, densities of 30 dwelling units per acre and is adjacent to Interstate 15 and Interstate 215, two major transportation routes.

In the 2008-2014 Housing Element, the City identified three sites to be rezoned to MF-3 and 78 acres of Transit Oriented Development (TOD) Overlay Program area to accommodate their very low and low-income RHNA allocation. During the planning period, Site Two, located at Jefferson and Juniper, was rezoned to the new MF-3 zone and a multi-family residential development, Monte Vista II was proposed and approved. The project is 100% affordable to lower income households and was developed at approximately 25 units per acre. The development was completed and opened in February of 2013. For the 2014-2021 Housing Element the City has removed Site 2 from their inventory, and retained Sites 1 and 3 which have been renumbered. Following a review of the City's existing parcel inventory within the TOD Program area, it was determined that the parcels listed in the previous Element have not been developed and will also be included in the 2014-2021 Element as potential opportunity sites.

In identifying areas available to accommodate their remaining units, the City wants to ensure that multifamily units are not concentrated in any one area of the City. Consequently, the sites selected are scattered throughout the jurisdiction near existing residential uses or services to support new development. A map showing all vacant residentially zoned sites and a table providing parcel numbers, the area of each site and other development information is provided in Appendix A.

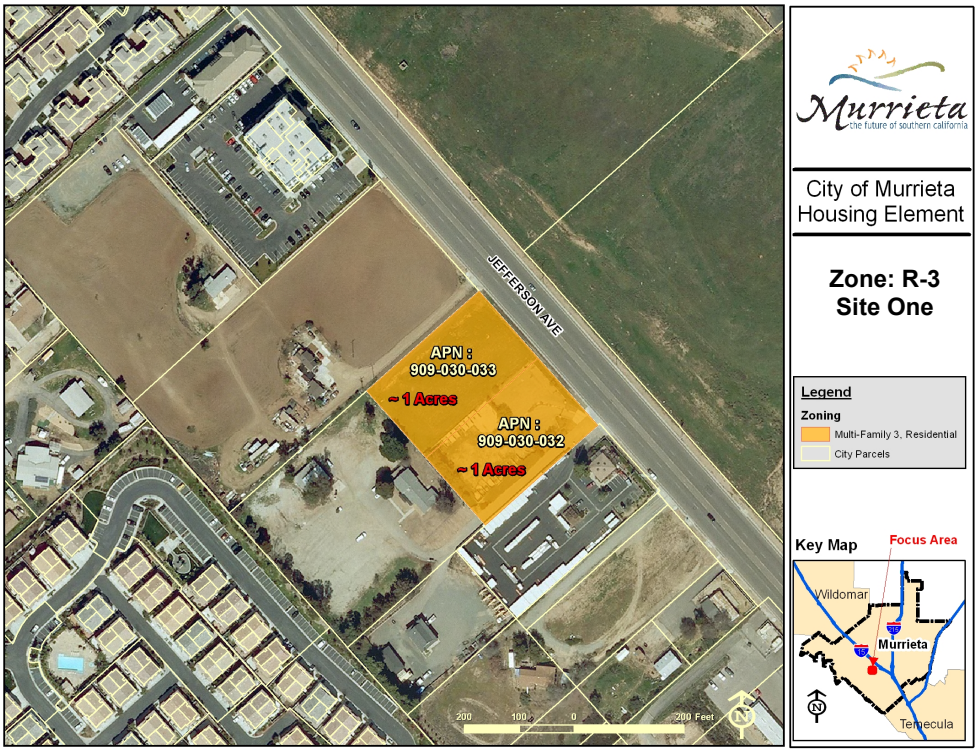
7.3.2.A - Site One – Jefferson South Property

Site One is located in the western half of the City, in close proximity to Interstate - 15. The site includes two contiguous vacant parcels totaling approximately 2.09 acres. Site One is bordered by Jefferson Avenue to the north with no official street boundaries to the south, west or east. The site is located within the Jefferson Avenue multi-modal, retail corridor and is zoned Multi-Family 3. The City purchased the site with the intention of developing housing where services and jobs are available.

During the 2008-2014 planning period, the Site One was rezoned from Multiple Use-3 to Multi-Family 3, which requires a minimum 30 dwelling units per acre. If developed at approximately 100% of its development potential, and at a density of 30 dwelling units per acre, Site One can accommodate 62 new units. This site is an appropriate to for the development of new higher density residential development, as the parcels are located in close proximity to existing multifamily homes developed in a Multi-Family 1 zone and retail services. The City anticipates that the remaining vacant parcels surrounding this site will also primarily include residential uses; consequently the development of these parcels would extend multifamily development in the area and create a more balanced mix of densities. There is also existing infrastructure that can be extended to provide services to the site. The City will offer a density bonus incentive, development concessions, site improvement assistance, HOME funding, when available, and fast track processing to encourage the development of affordable units. Funding opportunities and development incentive opportunities will be prioritized for projects that include units for extremely low- and very-low income households.

Exhibit 7-1 illustrates the boundaries and location of Site One, while Appendix A includes the specific parcels indentified as part of the site.

Exhibit 7-1: Site One



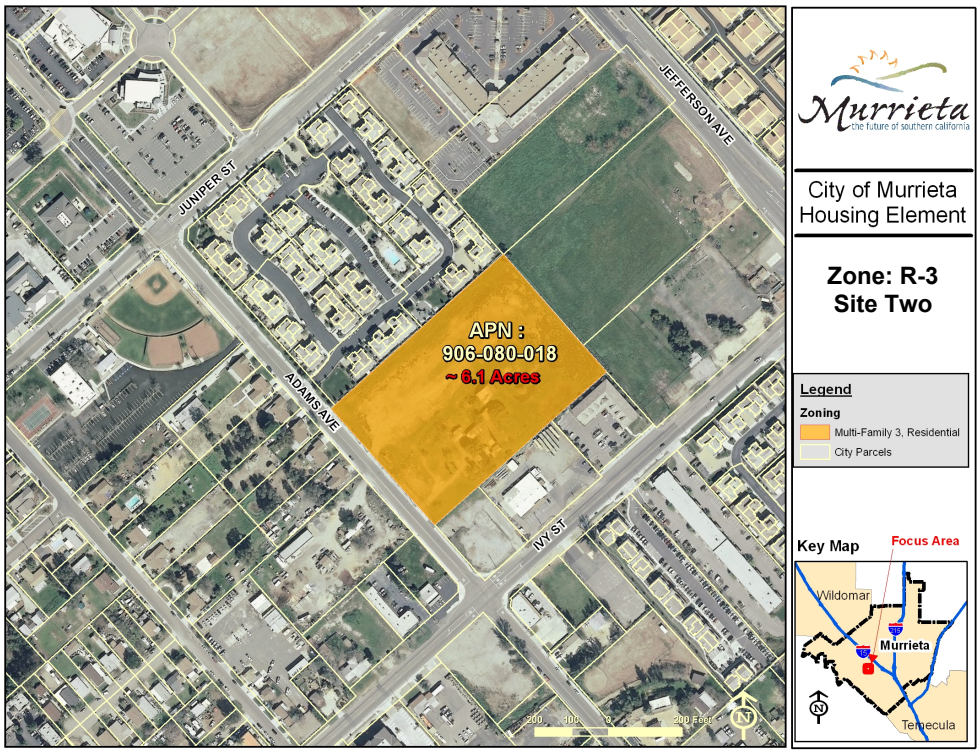
7.3.2.B - Site Two – Adams Avenue Property

Site Two is a 6 acre parcel located in the western half of the City in the Historic Murrieta Specific Plan area. The site is located northeast of the intersection of Adams Avenue and Ivy Street and is also in close proximity to Civic Center. Site Two is currently zoned Multi-Family 3, and is also owned by the City. The City purchased the site with the intention of developing an affordable housing development in the downtown where services and jobs are available. Site Two is in close proximity to Amberwalk, an existing affordable housing complex, suggesting that affordable housing is appropriate and supported by the neighborhood. The site is currently served by infrastructure that can support additional residential development.

During the 2008-2014 planning period, Site Two was rezoned from Village Residential to Multi-Family 3 which requires a minimum density of 30 dwelling units per acre. If developed at approximately 100% of its development potential and at a density of 30 dwelling units per acre, Site Two could accommodate 180 new units. In addition to the zone change, the City also amended the Historic Murrieta Specific Plan to allow for residential development up to 30 dwelling units per acre on this parcel. The City will offer a density bonus incentive, development concessions, site improvement assistance, RDA and/or HOME funding when available and fast track processing to encourage the development of affordable units. Funding opportunities and development incentive opportunities will be prioritized for projects that include units for extremely low- and very-low income households.

Exhibit 7-2 illustrates the boundaries and location of Site Two, while Appendix A includes the specific parcels indentified as part of the site.

Exhibit 7-2: Site Two



7.3.2.C - TOD Overlay Program

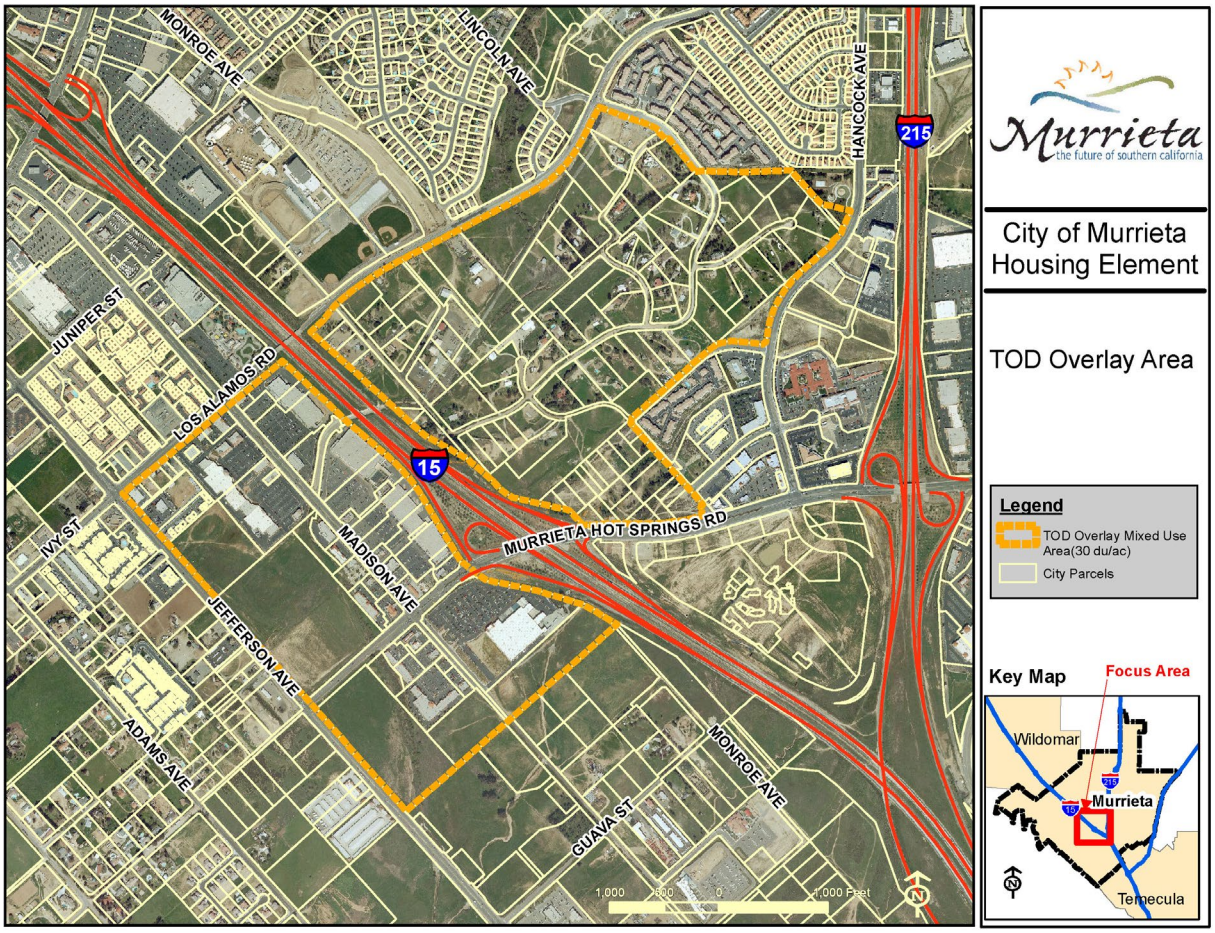
To accommodate a portion of the remaining low and very-low RHNA allocation, the City has established and implemented a new, "Transit Oriented Development (TOD) Overlay Program" to allow a mixture of residential and non-residential development in close proximity to transit. The TOD Overlay Program area has been established and consists of approximately 78 acres of land on either side of Interstate 15 (I-15). The area is bound by Los Alamos Road to the north, Jefferson Avenue to the west, Vista Murrieta and Hancock to the east, and is situated just north of Guava and Murrieta Hot Springs Road to the south. This area is also uniquely situated adjacent to the convergence of two freeways (I-15 and I-215) and along the route of the proposed High Speed Rail. The City is working with the cities of Temecula, Lake Elsinore, and Wildomar to establish Jefferson Avenue as a multi-modal transit corridor, to provide better connectivity and smart growth opportunities, including a mixture of residential and non-residential uses.

The parcels located to the west of I-15 include an older commercial district, which provides opportunities for redevelopment. The commercial buildings are showing their age and properties are not being utilized to their full potential. In addition, several vacant parcels, situated along Murrieta Hot Springs Road, a major east/west thoroughfare and a connection for I-15 and I-215, are ideal for TOD and high density housing. The area on the east side of I-15 is comprised of vacant and underutilized parcels that include a range of single-family home types, sizes, and ages. Development has been gradually encroaching around its perimeters, making this section no longer viable as a single-family rural area. The TOD Overlay Program will permit by right 30 dwelling units per acre, and if developed at 100% of its development potential could accommodate approximately 2,340 units.

The State has determined that most assisted housing developments utilizing State or federal financial resources include 50 to 150 units. As indicated in Action 1.6 of the Housing Plan, the City will provide incentives and technical assistance through the processing of subdivision or larger parcels located in the TOD Overlay Program area to facilitate development of a variety of housing types and affordability consistent with typical developments affordable to lower income households. The existing infrastructure from Jefferson Avenue and Los Alamos Road can support residential development. The City will offer a density bonus incentive, development concessions, site improvement assistance, HOME funding, when available, and fast track processing to encourage the development of affordable units. Funding opportunities and development incentive opportunities will be prioritized for projects that include units for extremely low- and very-low income households.

Exhibit 7-3 illustrates the boundaries and location of the TOD Overlay Program area.

Exhibit 7-3: TOD Overlay Program Area



7.4 - Summary of Available Sites

As shown in Table 7-3, the City is more than able to accommodate their 2014-2021 RHNA allocation of 1,573 units. Based on the permitted densities, vacant land zoned SF-1 and SF-2 and MU-3 can accommodate the City's above-moderate income RHNA allocation of 627 units. Similarly, vacant land zoned MF-2 can accommodate the City's moderate income RHNA allocation of 289 units. To accommodate their lower income RHNA, including the very low and low income allocations, totaling 657, the City has identified two opportunity sites that are zoned MF-3, permitting densities up to 30 dwelling units per acre. These two sites can accommodate approximately 242 units. Finally, the City has identified the TOD Overlay Program area, with permitted densities at 30 dwelling units per acre, to accommodate their remaining lower income RHNA allocation. The Program area can accommodate approximately 2,340 units.

Table 7-3: Accommodation of the RHNA

	Very Low/ Low	Moderate	Above Moderate	TOTAL
2014-2021 RHNA	**657**	**289**	**627**	**1,573**
Units Accommodated on vacant SF-1 and SF-2 zoned land	0	0	(425)	425
Units Accommodated on vacant MF-2 zoned land	0	(438)	0	438
Units Accommodated on vacant MU-3 zoned land	0	0	(780)	780
Units Accommodates on vacant MF-3 zoned	(242)	0	0	242
Units within the TOD Overlay Program area	(2,340)	0	0	2,340
Total remaining units	**0**[1]	**0**[1]	**0**[1]	**0**[1]

[1] While the number of units accommodated on MF-2 and MU-3 zoned land exceeds the City's RHNA allocation the City may not credit those units towards another income category unless the density is appropriate to accommodate those units. (i.e. although 1,205 units above moderate income are accommodated which is beyond the 627 RHNA allocation, the densities of the sites are not appropriate to accommodate the City's lower income RHNA.)

As shown in Table 7-3, the City is more than able to accommodate their remaining RHNA. Based on the sites identified, the City has shown a surplus of sites that can accommodate a total of 4,226 units; 2,653 units beyond their 2014-2021 RHNA allocation.

As discussed previously, the City of Murrieta has been successful in providing affordable housing within zoning designations that permit densities up to 18 units per acre. The City anticipates that creation of the MF-3 and TOD Overlay, which permit higher densities than ever previously allowed, will allow for the development of affordable housing to be more easily facilitated during the 2014-2021 planning period. The City recognizes that allowing for a variety of units in various areas at different densities is crucial to ensuring that affordable units are not concentrated in one specific area. It is also necessary to ensure that units of varying sizes, product types and styles can be developed. Based on the City's history of providing affordable units and the sites identified, the City has identified adequate opportunities for the production of affordable housing.

7.5 - Site Specific Constraints

7.5.1 - Environmental Constraints

Potential environmental constraints to future development of sites identified include the MSHCP and seismic and flooding hazards, which are addressed in the Non-Governmental Constraints Section of the Housing Element. Parcels identified in the Sites Inventory were compared with all hazards maps included in the City's Safety Element; none were found to be within areas that have development restrictions due to risk of damage from disasters (such as floods, wildfires, or seismic events). The sites inventoried have a land use designation which was determined based on surrounding land uses and has already examined potential environmental constraints. Aside from the constraints mentioned above, there are little additional constraints that would impede the development of new housing units in the future on the identified sites.

7.5.2 - Infrastructure

The City's five year Capital Improvement Plan has identified expenditures of City funds used for public improvement projects, including infrastructure. The City understands that improvements can be achieved with a comprehensive approach that includes reviewing infrastructure plans for each application for discretionary approval of General Plan amendments, tentative parcel or tentative tract maps, or development proposals that includes extension of an existing street or construction of a new street. The City requires that project applications for new development be reviewed for adequate infrastructure. Applications are evaluated on a case-by-case basis to ensure there is the capacity to service new developments. Infrastructure requirements and costs are also discussed in the Non-Governmental Constraints Section of the Housing Element.

7.6 - Resources

7.6.1 - Financial Resources

A variety of Federal, State, and local programs are available to create and/or maintain rental and purchase affordability for lower income households and for persons with special needs. These programs are also available to other jurisdictions for potential acquisition, subsidy, or replacement of units at-risk. In previous years, the primary source of funds for affordable housing activities in Cypress was from the Redevelopment Agency housing set-aside fund. The 2008-2014 Housing Plan identified the following programs as reliant on RDA set-aside funds:

- General Plan Review
- First Time Homebuyer Program
- Land/Property Acquisition Program
- Lot Consolidation Program
- Housing for ELI Households Program
- Monitor Affordable Units
- Purchase Land Covenants
- Riverside County Partnership Program
- Density Bonus Ordinance

- Fee Subsidies Program
- Incentives for Large Multi-Family Units
- Residential Development Standards

On Dec. 29, 2011, the California Supreme Court ruled to uphold ABx1 26, which dissolved all redevelopment agencies (RDAs) in the State. A companion bill, ABx1 27, which would have allowed the RDAs to continue to exist, was also declared invalid by the court. The court's decision required that all RDAs within California be eliminated no later than February 1, 2012. In January of 2012, City of Murrieta Redevelopment Agency was dissolved. The City created and selected the Murrieta Housing Authority to be the Successor Agency responsible for all enforceable obligations owed.

The City previously relied on estimated redevelopment housing set-aside revenues ranging from $1.8 to $2 million annually to support the development of affordable housing and the implementation of programs outlined in the Housing Plan. For the 2014-2021 planning cycle, the City is investigating new funding sources to utilize to continue administering its existing programs.

The following summarizes financial resources available to the City, private, and non-profit parties to preserve/create housing that is affordable. Programs that may be of use in Murrieta are listed below. Information related to these programs will be updated annually and made available by the City of Murrieta.

7.6.2 - Federal Programs

- **Community Development Block Grant Program (CDBG)** – This program is available and can be used to enhance and preserve the City's affordable housing stock. Funds are applied for through Riverside County. Eligible activities include acquisition, rehabilitation, economic development, and public services. CDBG grants benefit primarily households with incomes not exceeding 80 percent of the County area median income.

- **Home Investment Partnership (HOME)** - Murrieta does not receive HOME funds directly from the Federal government. However, Murrieta can apply for HOME funds through the State of California's annual NOFA. Affordable rental housing projects in Murrieta can apply for HOME funds through the County of Riverside annual NOFA. HOME funds are used to assist low income (80% AMI) households.

- **Section 8 Rental Assistance Program** – This program provides rental assistance payments to owners of private market-rate units on behalf of very low-income tenants.

- **Section 811/202 Program** – Non-profit organizations and consumer cooperatives are eligible to receive no interest capital advances from HUD for the construction of very low-income rental housing for senior citizens and disabled persons. Project-based assistance is also provided in conjunction with this program. Section 811 can be used to develop group homes, independent living facilities, and intermediate care facilities. Eligible activities include acquisition, rehabilitation, new construction, and rental assistance.

- **Emergency Shelter Grant (ESG) Program** Funds emergency shelters, services and transitional housing for homeless individuals and families.

- **Neighborhood Stabilization Program (NSP) Funds** - Provide funds to purchase abandoned and foreclosed homes and residential property.

- **Housing Opportunities for Persons with AIDS (HOPWA)** - HOPWA is an entitlement grant distributed to the largest jurisdiction in each county. HOPWA funds may be used for a wide range of housing, social services, program planning, and development costs. These include, but are not limited to, the acquisition, rehabilitation, or new construction of housing units; costs for facility operations; rental assistance; and short-term payments to prevent homelessness. HOPWA funds also may be used for health care and mental health services, chemical dependency treatment, nutritional services, case management, assistance with daily living, and other supportive services.

- **Supportive Housing Program** - Provides funding to develop supportive housing and services that will allow homeless persons to live as independently as possible. Grants under the Supportive Housing Program are awarded through a national competition held annually.

- **Choice Neighborhoods Grants** - Funds to address distressed neighborhoods and public and assisted projects to transform them into viable and sustainable mixed-income neighborhoods by linking housing improvements with appropriate services, schools, public assets, transportation, and access to jobs. Planning grants and implementation grants are available.

7.6.3 - State Programs

- **California Housing Finance Agency (CalHFA)** – CalHFA sells tax exempt bonds for below market rate loans to first-time homebuyers. The program operates through participating lenders who originate loans for CalHFA purchase.

- **Low-Income Housing Tax Credits (LIHTC)** – Tax credits available to individuals and corporations that invest in low-income rental housing. Tax credits sold to people with high tax liability, and proceeds are used to create housing.

- **Building Equity and Growth in Neighborhoods (BEGIN)** - Grants to cities to provide down payment assistance (up to $30,000) to low and moderate income first-time homebuyers of new homes in projects with affordability enhanced by local regulatory incentives or barrier reductions.

- **Cal Home** - Grants to cities and non-profit developers to offer homebuyer assistance, including down payment assistance, rehabilitation, acquisition/rehabilitation, and homebuyer counseling. Loans to developers for property acquisition, site development, predevelopment and construction period expenses for homeownership projects.

- **Multifamily Housing Program (MHP)** – Deferred payment loans for new construction, rehabilitation, and preservation of rental housing. Administered by HCD.

- **Transit-Oriented Development Housing Program** - Under the program, low-interest loans are available as gap financing for rental housing developments that include

affordable units, and as mortgage assistance for homeownership developments. In addition, grants are available to cities, counties, and transit agencies for infrastructure improvements necessary for the development of specified housing developments, or to facilitate connections between these developments and the transit station.

- **Infill Incentive Grant Program** - Funding of public infrastructure (water, sewer, traffic, parks, site clean-up, etc) to facilitate infill housing development. One funding round annually.

- **Infill Infrastructure Grant Program (IIG)** - Provides grants for infrastructure construction and rehabilitation to support higher-density affordable and mixed-income housing in infill locations.

- **Multifamily Housing Program** - Provides funding for new construction, rehabilitation, or acquisition and rehabilitation of permanent or transitional rental housing, and the conversion of nonresidential structures to rental housing. Projects are not eligible if construction has commenced as of the application date, or if they are receiving 9% federal low income housing tax credits. Eligible costs include the cost of child care, after-school care and social service facilities integrally linked to the assisted housing units; real property acquisition; refinancing to retain affordable rents; necessary onsite and offsite improvements; reasonable fees and consulting costs; and capitalized reserves.

- **Predevelopment Loan Program (PDLP)** - Provides predevelopment capital to finance the start of low income housing projects.

- **CalHFA Mental Health Services Act Funds** - Jointly administered by the California Department of Mental Health and the California Housing Finance Agency on behalf of counties, the Program offers permanent financing and capitalized operating subsidies for the development of permanent supportive housing, including both rental and shared housing, to serve persons with serious mental illness and their families who are homeless or at risk of homelessness. MHSA Housing Program funds will be allocated for the development, acquisition, construction, and/or rehabilitation of permanent supportive housing.

- **CalHFA New Issue Bond Program (NIBP)** - Provides affordable housing bond funding to CalHFA and other housing finance agencies. This funding allows developers to secure a source of affordable financing in the marketplace which otherwise could not be obtained.

- **Golden State Acquisition Fund (GSAF)** - Affordable Housing Innovation Program (AHIP): provides loans for developers through a nonprofit fund manager to provide quick acquisition financing for the development or preservation of affordable housing.

- **Emergency Housing and Assistance Program Operating Facility Grants (EHAP)** - Provides operating facility grants for emergency shelters, transitional housing projects, and supportive services for homeless individuals and families.

- **Emergency Housing and Assistance Program Capital Development (EHAPCD)** - Funds capital development activities for emergency shelters, transitional housing, and

safe havens that provide shelter and supportive services for homeless individuals and families.

- **Emergency Solutions Grant (ESG) Program** - Funds projects that serve homeless individuals and families with supportive services, emergency shelter/transitional housing, assisting persons at risk of becoming homeless with homelessness prevention assistance, and providing permanent housing to the homeless population. The Homeless Emergency Assistance and Rapid Transition to Housing (HEARTH) Act of 2009 places new emphasis on assisting people to quickly regain stability in permanent housing after experiencing a housing crisis and/or homelessness.

7.6.4 - Local Programs

- **Riverside County Mortgage Credit Certificate Program (MCC)** – Income tax credits available to first-time homebuyers for the purchase of new or existing single-family housing. Local agencies make certificates available.

- **Riverside County Mortgage Revenue Bond** – Bonds used to finance the development of multifamily housing for lower- and moderate-income households.

- **Home Improvement Grant** – Run by Riverside County, funding is available for exterior and/or interior repairs and improvements costing up to $10,000 for homeowners that are over age 62, or households where the head of household or spouse are handicapped or disabled.

7.6.5 - Administrative Resources

- **City of Murrieta Planning Department** – The primary responsibility of the Planning Department is the long-range planning and physical development of the City to promote livability and appearance. The department ensures the City's viability through enforcement of land use, construction, health, safety, and environmental regulations. This involves land use and development standards, building codes, economic vitality, and adherence to the General Plan. It is also responsible for the administration of the General Plan and implementation of the Zoning Ordinance and Specific Plans.

- **City of Murrieta Housing Authority** – The Housing Authority is responsible for the City's redevelopment, and affordable housing activities. Staff manages the CDBG, and HOME funds, and is active in filing grant applications and administration of funds made available for City programs. The Authority is also responsible for projects involving affordable housing development through new construction and acquisition/rehabilitation, when funding is available.

Progress Report

Section 8

The Progress Report reviews the previous Housing Element's programs, objectives, and actions that were to be implemented during the previous planning period. The City of Murrieta 2008-2014 Housing Element identified five goals to be implemented during the previous planning period. Each goal has specific policies that were to be achieved in order to facilitate the construction of affordable housing and to maintain the existing affordable housing stock. Each policy has specific actions and quantified objectives that were to be implemented to accomplish the goal of the program. Each of the actions and objectives had a timeframe for completion along with a responsible agency to monitor the program.

The accomplishments are listed on the right column of the table and display the progress, effectiveness, and appropriateness of the program. Pursuant to Government Code Section 65588 local governments shall review their Housing Element and evaluate the following:

1) The progress of the City or County in implementation of the housing element.

2) The effectiveness of the housing element in attainment of the community's housing goals and objectives.

3) The appropriateness of the housing goals, objectives, and policies in contributing to the attainment of the State housing goal.

The following table reviews the continued progress in implementation, the effectiveness of the Housing Element, and the appropriateness of the City's housing goals since 2006. Table 8-1 provides a summary of housing programs that have been achieved, partially achieved or not achieved.

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Goal 1: Provide adequate housing opportunities throughout the City of Murrieta.	
Program	**Accomplishments**
Action 1.1 – General Plan Review **Objective:** Complete a General Plan update and continue to review the Zoning Code for inconsistencies and standards that may prevent the development of affordable housing.	**Effectiveness:** On July 19, 2011, the Murrieta City Council voted to adopt General Plan 2035 and certify the Final Environmental Impact Report, as well as adopt the Climate Action Plan. The General Plan 2035, made significant changes to simplify the land use designations, reducing the number of designations that allow residential uses from eight to four. In late 2012, the City initiated an update of the Zoning Code to ensure consistency with the new General Plan. Due to staffing reductions in the Community Development Department, a comprehensive Zoning Code update is in process, but has not been completed. **Appropriateness:** The City anticipates that Staff will be able to effectively implement this program during the planning period. For the 2014-2021 planning period, the City will continue to review the General Plan and Zoning Code periodically to maintain consistency and ensure that development standards do not prevent or constrain the development of housing for all income levels. This program will be included in the 2014-2021 Housing Element.
Action 1.2 – Land Use Database **Objective:** Provide information on development opportunities to interested developers online, at City Hall and in other public places.	**Effectiveness:** The City maintains and regularly updates an inventory of available and potential development opportunity areas. City Staff is prepared to assist interested developers with information on development opportunity sites and the City has a history of providing City-owned land for the development of new affordable units. In 2008, the City purchased a 2 acre site at the corner of Jefferson Avenue and Juniper Avenue known as "Monte Vista II" for approximately $1.3 million. This development is the extension of the existing Monte Vista project, an affordable housing complex with 64 deed restricted units. Construction was initiated in 2011 to develop 40 rental units, all affordable to moderate and low income households. Monte Vista II was officially opened in February 2013. **Appropriateness:** The City was able to effectively implement this program during the planning period. For the 2014-2021 planning period, the City will continue to provide information on development opportunities to interested developers at City Hall and in other public places. This program will be included in the 2014-2021 Housing Element

Goal 1: Provide adequate housing opportunities throughout the City of Murrieta.	
Program	**Accomplishments**
Action 1.3– First-Time Home Buyer Assistance Program **Objective:** The City will also establish the program and provide information at City Hall, on the City's website and in other public places to increase awareness. Assist 10 units during the planning period.	**Effectiveness:** The City was able to establish a first-time homebuyer assistance program in 2010 and administered $20,000 loans to 6 households in fiscal year 2010-2011. With the dissolution of the Murrieta Redevelopment Agency in January 2012, funding for this program was suspended. As the City has created and identified the Murrieta Housing Authority as the successor agency to the RDA, the Housing Authority will be responsible for the continuation of the program, should funding become available. It is possible that as the initial 6 loans are repaid to the City, that this funding may be available to assist additional households, however a number of the households assisted are in the process of foreclosure, meaning that the City's funds may not be recovered. The City continues to seek new funding sources for the program. **Appropriateness:** While this program will be included in the 2014-2021 Housing Element the program will be administered based on funds available. It is the City's hope that as the economy improves, having this program in place will allow Staff to easily begin accepting applications when funding is available. This program will be included in the 2014-2021 Housing Element
Action 1.4– Land and Property Acquisition Program **Objective:** Allocate $4.8 million in set aside funds to purchase three properties totaling 10.09 acres of land in order to construct 302 affordable units.	**Effectiveness:** In 2008, the City purchased a 2 acre site at the corner of Jefferson Avenue and Juniper Avenue known as "Monte Vista II" for approximately $1.3 million. This development is the extension of the existing Monte Vista project, an affordable housing complex with 64 deed restricted units. Construction was initiated in 2011 to develop 40 rental units, all affordable to moderate and low income households. Earlier in the planning period, the City also closed on a 6.2 acre property on Adams Avenue using $3.5 million in redevelopment set-aside funds. Development of this parcel has not occurred. The City was able to achieve its goal of acquiring 10.9 acres of land for the purposes of facilitating the development of new affordable units. **Appropriateness:** While this program will be included in the 2014-2021 Housing Element the program will be administered based on funds available. As the City has created and identified the Murrieta Housing Authority as the successor agency to the RDA, the Housing Authority will be responsible for the continuation of the program. It is the City's hope that as the economy improves having this program in place will allow Staff to purchase sites when funding is available. This program will be included in the 2014-2021 Housing Element

Goal 1: Provide adequate housing opportunities throughout the City of Murrieta.	
Program	**Accomplishments**
Action 1.5 - Lot Consolidation Program **Objective:** The City will promote the program at City Hall, on its website and will evaluate requests for funding on a case by case basis.	**Effectiveness:** The City has not to date had an application or a request from a developer to consolidate lots for the purposes of creating a larger development. The City has historically offered development incentives for projects that include affordable units and will continue to offer these incentives for projects requiring lot consolidation actions. On a case-by-case basis the City does review projects and provides project assistance to developments that include affordable units, when funding is available. **Appropriateness:** The City recognizes the importance of offering incentives to encourage lot consolidation and will continue to provide incentives when feasible. The City will continue to provide information on this program to developers with applicable projects. While funding is limited, the City recognizes the importance of maintaining this program, which will allow Staff to easily administer funds as they become available. This program will be included in the 2014-2021 Housing Element.
Action 1.6 – Large Sites Program **Objective:** The City will promote the program at City Hall, on its website and will evaluate requests for funding on a case by case basis. Monitor the program bi-annually.	**Effectiveness:** The City has not to date had an application or a request from a developer to subdivide larger parcels for the purposes of developing new residential units affordable to lower income households. The City has historically offered development incentives for projects that include affordable units and will continue to offer these incentives for projects requiring the subdivision of larger parcels. The City currently monitors the number of large sites available to be developed for a variety of income groups to determine the effectiveness of the program. **Appropriateness:** As there remain a number of larger parcels (>15 acres) located in the TOD Overlay Program area, which is identified as a housing opportunity area, the City will continue to provide incentives, when feasible, to assist with subdivision to facilitate and encourage the development of a variety of housing opportunities. While funding is limited, the City recognizes the importance of maintaining this program, which will allow them to easily administer funds as they become available. This program will be included in the 2014-2021 Housing Element.

Goal 1: Provide adequate housing opportunities throughout the City of Murrieta.	
Program	**Accomplishments**
Action 1.7 – Housing for Extremely Low Income Families **Objectives:** The City will promote the program at City Hall, on its website and will evaluate requests for funding on a case by case basis.	**Effectiveness:** Throughout the planning period, the City has continued to apply for State and Federal funds for direct support of low-income housing construction and rehabilitation. The former Redevelopment Agency, newly created Murrieta Housing Authority have continued to monitor and access potential funding sources, including CDBG and HOME funds. The City currently provides information on their website and at City Hall on applicable programs and assistance available through the City, County and State. **Appropriateness:** The City recognizes the importance of providing direct support of low-income housing construction and rehabilitation. The City will continue to provide information on available programs and funding opportunities to residents on City website and at City Hall. This program will be included in the 2014-2021 Housing Element.

Goal 2: Conserve and enhance the quality of existing housing and residential neighborhoods.	
Program	**Accomplishments**
Action 2.1 –Property Maintenance Enforcement **Objective:** Maintain the quality of the existing housing stock by addressing code violations as they are reported. Refer eligible property owners to Riverside County programs if property maintenance funding is needed.	**Effectiveness:** The Police Department operates the Code Enforcement Program. Code enforcement officers inspect residences to make sure they are in compliance with the California Building Code and the City's Municipal Code. If tenants complain about maintenance problems, Code Enforcement will investigate the complaint and send violation notices if necessary. As the majority of the residential units in the City were constructed after 1980, the code enforcement violations reported are often minor and do not result in major health and safety violations. The City's program has successfully brought cited residential units into compliance with City codes. **Appropriateness:** This program will increase in its effectiveness in the future as the age of the housing stock increases. The City will continue to use the Code Enforcement Program to regulate property maintenance and compliance with the California Building Code and the City's Municipal Code. This program will be included in the 2014-2021 Housing Element.

Goal 2: Conserve and enhance the quality of existing housing and residential neighborhoods.	
Program	**Accomplishments**
Action 2.2 – Monitor Affordable Units **Objective:** Maintain a list of affordable units throughout the City including affordability information to ensure property owners are compliant with deed restrictions and to preserve affordable units.	**Effectiveness:** The City currently has a number of deed restricted units throughout the City. As shown in the Housing Profile section, the existing complexes with covenants will remain affordable until after 2050. The City maintains compliance with AB 987 and publishes a table annually with information on affordable units that exist in the City. **Appropriateness:** The City maintains a number of affordable units through existing deed restrictions. No units are at-risk of conversion to market rate during the 2014-2021 planning period. An inventory of affordable units will be kept up-to-date by the Murrieta Housing Authority to monitor affordable units throughout the planning period and update the list with new deed restricted properties that are developed during the planning period. This program will be included in the 2014-2021 Housing Element.
Action 2.3– Purchase Housing Covenants **Objective:** The City will budget $200,000-300,000 during the planning period to allow for the creation of 10 affordable units within the planning period.	**Effectiveness:** With the dissolution of the City's Redevelopment Agency and the taking of RDA funds, the City had limited funding available to accomplish the objectives of this program. Therefore the City was unable to meet its planned objective to purchase convents to create 10 new affordable units during the 2008-2014 planning period. **Appropriateness:** The City recognizes that purchasing covenants is an ideal method for the creation of new affordable units, without requiring new construction. Currently, funding for this program is limited; however the City recognizes the importance of maintaining this program, which will allow them to easily administer funds as they become available. The City will continue to discuss the potential for conversion of units from market rate to affordable with property owners whenever possible to identify future opportunities. This program will be included in the 2014-2021 Housing Element.

Goal 2: Conserve and enhance the quality of existing housing and residential neighborhoods.	
Program	**Accomplishments**
Action 2.4 –Neighborhood Stabilization Program **Objective:** Support local organizations to ensure their continued ability to provide services to residents.	**Effectiveness:** When necessary the City provides letters of support for participating organizations such as: Habitat for Humanity and the Housing Authority of Riverside to ensure that these organizations have funding to assist the City with foreclosure property rehabilitation and the resale of units to moderate and low-income homebuyers. **Appropriateness:** While the number of foreclosed priorities in the City has lessened, the Neighborhood Stabilization Program continues to offer funds to purchase and redevelop foreclosed and abandoned homes and residential properties to stabilize existing neighborhoods. The City will continue to offer their support in any way possible to participating organizations to ensure funding is available to assist the City with foreclosure property rehabilitation and the resale of units to moderate and low-income homebuyers. This program will be included in the 2014-2021 Housing Element.
Action 2.5– Energy Efficient Design **Objective**: Apply for $881,500 in funding to focus on energy efficiency and sustainability in the General Plan update.	**Effectiveness:** On an ongoing basis the City reviews applicable ordinances and recommends changes to encourage energy efficient housing design and practices that are consistent with state regulations. In October 2009, the City applied for $881,500 in Energy Efficiency Community Development Block Grant (EECDBG) money and was awarded the full amount to assist with the General Plan update. As part of the 2035 General Plan update the City prepared a Healthy Community Element and addressed energy efficiency through the required Elements. **Appropriateness:** The City recognizes the importance of encouraging energy efficient design, particularly in the design of new residential units for lower income households. The City will continue to encourage maximum utilization of Federal, State, and local government programs, such as the County of Riverside Home Weatherization Program, that assist homeowners in providing energy conservation measures. Staff will provide information on available programs and funding opportunities to residents on City website and at City Hall. This program will be included in the 2014-2021 Housing Element.

Goal 2: Conserve and enhance the quality of existing housing and residential neighborhoods.	
Program	**Accomplishments**
Action 2.6 – Riverside County Partnership Program **Objective:** Increase resident awareness about housing programs offered by the County by providing information at City Hall and on the City's website.	**Effectiveness:** The City currently offers information on their website and on City Hall on housing programs offered by the City, the County of Riverside Housing Authority, and other local housing service providers. **Appropriateness:** The County offers a variety of housing assistance programs that can supplement the City's current housing programs. Consequently, the City will continue to provide information on programs offered by the County on the City website, at City Hall, and in other public places. This program will be included in the 2014-2021 Housing Element.

Goal 3: Minimize the impact of governmental constraints on housing production and affordability.	
Program	**Accomplishments**
Action 3.1 – Density Bonus Ordinance **Objective**: Provide information about such incentives at City Hall, on the City's website and in other public places to increase awareness. Encourage the construction of 10 units over the planning period.	**Effectiveness:** Section 16.20 of the Development Code provides for density bonuses pursuant to the provisions of State law. In late 2012, the City completed a review of the density bonus provisions and on October 15, 2013, the City Council adopted an updated ordinance. The updates completed ensure that the City is in compliance with State law. City staff has made the Code provisions readily available to those developers seeking a density bonus and actively supports these bonuses when they are in compliance with the State law and the Development Code. In 2010, the City Council approved a 10 percent density bonus, for the Monte Vista II project, allowing four more units to complete the planned 40 unit development. **Appropriateness:** The City recognizes the importance of offering incentives like the density bonus incentive and will continue to provide this incentive in the future. The City will continue to provide information on this program to developers with applicable projects. While funding is limited, the City recognizes the importance of maintaining this program, which will allow them to easily administer funds as they become available. This program will be included in the 2014-2021 Housing Element

Goal 3: Minimize the impact of governmental constraints on housing production and affordability.	
Program	**Accomplishments**
Action 3.2 – Permit Processing Time **Objective:** Provide information about permit streamlining at City Hall, on the City's website and in other public places to increase awareness.	**Effectiveness:** Throughout the planning period, the City offered and promoted streamlined development processing, prioritizing the review of projects that include affordable units. Staff continuously facilitates inter-departmental collaboration to ensure that the application process is as efficient as possible. **Appropriateness:** The City recognizes the importance of providing a streamlined review process and approving residential projects as quickly as possible to minimize funds lost due to schedule delays. This program will be included in the 2014-2021 Housing Element.
Action 3.3 – Fee Subsidies for Extremely Low-Income Households **Objective:** Provide information about fee subsidies for residential development that includes units for extremely low income units at City Hall, on the City's website and in other public places to increase awareness.	**Effectiveness:** In 2006, the City of Murrieta conditioned two developers proposing within the redevelopment area to provide 15 percent of the units constructed to be set-aside as affordable, 18 for very low- and 22 for moderate-income, for a total of 40 affordable units. These developments had portions of their development fees waived. Later in the planning period the City worked with Affirmed Housing to construct 40 affordable units in the new Monte Vista II project. To achieve 100 percent affordability the City provided the land worth more than $1.3 million for the development and subsidized fees to make development feasible. **Appropriateness:** The City recognizes the importance of offering incentives including fee subsidies to encourage the development of housing for extremely low income households and will continue to provide incentives when feasible. The City will continue to provide information on this program to developers with applicable projects. While funding is limited, the City recognizes the significance of maintaining this program, which will allow Staff to easily administer funds as they become available. This program will be included in the 2014-2021 Housing Element.

Goal 3: Minimize the impact of governmental constraints on housing production and affordability.	
Program	**Accomplishments**
Action 3.4 – Incentives for Large Multifamily Units **Objective:** Aim to construct 16 multifamily rental units with three or more bedrooms in the planning period.	**Effectiveness:** In 2008, the City purchased a 2 acre site at the corner of Jefferson Avenue and Juniper Avenue for approximately $1.3 million, to develop a new residential project called "Monte Vista II". This development is the extension of the existing Monte Vista project, an affordable housing complex with 64 deed restricted units. Construction was initiated in 2011 to develop 40 rental units, all affordable to moderate and low income households. The project includes 4 units with 3 bedrooms and 16 units with 4 bedrooms. The City achieved its objective to construct 16 units for large families during the planning period. **Appropriateness:** Large renter households continue to be a prominent special needs group in the City, as identified in Chapter 5, *Housing Needs*. The City will continue to provide incentives, when feasible, to encourage developers to provide units with three or more bedrooms. While funding is limited, the City recognizes the importance of maintaining this program, which will allow them to easily administer funds as they become available. This program will be included in the 2014-2021 Housing Element.

Goal 3: Minimize the impact of governmental constraints on housing production and affordability.	
Program	**Accomplishments**
Action 3.5 – Residential Development Standards **Objectives:** Review development standards to identify constraints and remove or offset constraints where possible.	**Effectiveness:** On July 19, 2011, the Murrieta City Council voted to adopt General Plan 2035. The General Plan 2035, made significant changes to simplify the land use designations, reducing the number of designations that allow residential uses from eight to four. In late 2012 the City initiated an update of the Zoning Code to ensure consistency with the new General Plan. Due to staffing reductions in the Community Development Department, a comprehensive Zoning Code update is in process, but has not been completed or adopted. As part of the Zoning Code update Staff committed to review the residential development standards to identify potential constraints to the development of affordable housing and housing for special groups such as disabled individuals. Specific standards focused on include: lot coverage, parking requirements and minimum parcel size. In general the City is flexible and committed to the provision of affordable units, even if development standard modifications are required. During the planning period, the City worked with Affirmed Housing Group to develop Monte Vista II, a multifamily development with 40 affordable units. To achieve additional affordable units the City allowed modifications for on-site circulation and access as well as reduced parking standards. **Appropriateness:** The City recognizes the importance of reviewing their development standards on a regular basis and seeking input from developers to identify potential constraints to the development affordable housing. The City will continue to review their standards and address any standards that may be identified in the 2014-2021 Housing Element. This program will be included in the 2014-2021 Housing Element.
Action 3.6 – Second Unit Ordinance **Objective:** Construct 5 units over the planning period.	**Effectiveness:** In March of 2013, a revised version of the City's second unit ordinance was presented to the City Council for adoption. The update to the City's existing ordinance ensures that the City is compliance with State law. During the 2008-2014 planning period, the City continued to provide for second units in R-1 zones with an appropriate lot area. Since 2006, 18 second unit developments were approved, an average of 3 per year, which surpasses the City's goal of 5 new units during the planning period. **Appropriateness:** The City recognizes second units as an affordable housing option and will continue to allow for second units to be constructed. This program will be included in the 2014-2021 Housing Element.

Goal 3: Minimize the impact of governmental constraints on housing production and affordability.	
Program	**Accomplishments**
Action 3.7 – Water and Sewer Service Providers **Objective:** Ensure that water and sewer providers are aware of the City's intentions for residential development throughout the City.	**Effectiveness:** Following the certification and adoption of the 2008-2014 Housing Element the City submitted the final draft to the appropriate water and sewer service providers. **Appropriateness:** As required by State law, the City will submit the final 2014-2021 Housing Element to local water and sewer providers for their review and input. This program will be included in the 2014-2021 Housing Element.
Action 3.8 - Flood Management **Objective:** Ensure that flood risks are considered when making land use decisions	**Effectiveness:** In accordance with Government Code Section 65302, as part of the recent General Plan update the City revised the Conservation and Safety Elements to take into account potential flood risks based on updates to the Land Use Element. Specifically, the City has updated the Conservation Element to identify rivers, creeks, streams, flood corridors, riparian habitats, and land that may accommodate floodwater for purposes of groundwater recharge and storm water management. Additionally, the Safety Element has been updated to include information regarding flood hazards and establishes a set of comprehensive goals, policies, and objectives for the protection of Murrieta residents from the unreasonable risks of flooding. **Appropriateness:** As the City recently completed a General Plan update in 2011, and the Safety and Conservation Elements were appropriately revised, this action is no longer necessary. This program will not be included in the 2014-2021 Housing Element.

Goal 4: Promote equal housing opportunity for all residents.	
Program	**Accomplishments**
Action 4.1 – Reasonable Accommodation **Objective:** Provide information about reasonable accommodation at City Hall, on the City's website and in other public places to increase awareness.	**Effectiveness:** On October 15, 2013, the City Council adopted an ordinance establishing a reasonable accommodation procedure to address existing constraints to the provision of accommodations for persons with disabilities. The City is committed to assisting residents in need of reasonable accommodation and will continue to direct eligible residents to apply for applicable funds through the Riverside County including the Home Repair Loan Program (HRLP) and Senior Home Repair Grant (SHRG). The HRLP provides one-time loans to qualified low-income homeowners to repair or improve the quality of their homes. The loan is designed to address health and safety issues, Housing Quality Standards (HQS) and improve substandard living conditions within the scope of eligible program repairs. The SHRG Program provides one-time grants to qualified very low-income senior homeowners (62 years or older) or very low-income persons with disabilities of any age to repair or improve their homes within the scope of eligible program repairs. The grant requires that repairs address health and safety issues and handicapped accessibility improvements exclusively. **Appropriateness:** The City has effectively implemented this program within the 2008-2014 planning period. Due to staffing restrictions, the timeframe was pushed back from the goal date; however, the program is in place and will be advertised by the end of the planning period. For the 2014-2021 planning period the City will continue to partner with the County of Riverside and will promote the adopted reasonable accommodation procedures on the City website and at City Hall.

Goal 4: Promote equal housing opportunity for all residents.	
Program	**Accomplishments**
Action 4.2 – Fair Housing **Objective:** Cooperate as needed with the Fair Housing Council of Riverside County, Inc., to mediate housing issues involving Murrieta residents. Provide information about tenant and landlord housing rights at City Hall, on the City's website and in other public places to increase awareness.	**Effectiveness:** The City maintains an active partnership with the Riverside County Fair Housing Council. The City provides information to residents on the process to file complaints with the Fair Housing Council to eliminate housing discrimination. Throughout the planning period the City has made pamphlets available at City Hall regarding information about fair housing as provided by the Fair Housing Council. With the elimination of the Redevelopment Agency, the Murrieta Housing Authority has been identified to maintain the City's relationship with the Fair Housing Council and will continue to provide information about tenant and landlord housing rights offered. The Housing Authority will work cooperatively with the Fair Housing Council to actively pursue any complaints of housing discrimination within the City. **Appropriateness:** The City will continue to be involved with the Fair Housing Council to eliminate housing discrimination and distribute information to the public about how they can report housing discrimination. This program will be included in the 2014-2021 Housing Element.
Action 4.3– Homeless Assistance Program **Objective:** Provide referrals to the appropriate organizations.	**Effectiveness:** During the 2008-2014 planning period, approximately 2 homeless individuals were identified in the City. Throughout the planning period, City continued to assist local nonprofit organizations that have expertise in assisting homeless persons and families to apply for funding from the Riverside County CDBG program. Currently, organizations apply to the City and the City is responsible for reviewing applications and recommending specific organizations receive funding. During the planning period the following organizations located in Murrieta were assisted: Boys and Girls Club - S.W. County, Domestic Violence Services, Community Food Pantry of Murrieta, Murrieta Rescue Mission, and the Women's Health Assistance Program. CDBG funds are critical for these organizations, allowing them to provide irreplaceable services to extremely low-income families in the community. **Appropriateness:** The newly formed Murrieta Housing Authority will be responsible for the CDBG application process and assisting organizations in successfully acquiring funding for the 2014-2021 planning period. The City will provide information on the City website and will continue to partner with local agencies to make sure that the proper services are available for extremely low income residents. This program will be included in the 2014-2021 Housing Element.

Goal 4: Promote equal housing opportunity for all residents.	
Program	**Accomplishments**
Action 4.4 – Foreclosure Prevention Program **Objective:** Provide information on the City's website, at City Hall and in other public places regarding organizations and programs that address how to prevent and address foreclosure if it does occur.	**Effectiveness:** Through the County of Riverside Housing Authority and the Fair Housing Council of Riverside County, the City provides residents with foreclosure counseling services. The Fair Housing Council holds workshops once a month at various locations throughout the region for homeowners that are struggling to afford their mortgage payments and are at risk of foreclosure. Homeowners are advised to bring specific financial materials (i.e. tax returns and pay stubs) so that a counselor can assist them personally. **Appropriateness:** While the number of foreclosed properties and households in need of foreclosure services has drastically declined since 2008, this program offers a valuable service and important information to households that are struggling to afford their home payments. The City will continue to promote available counseling services and will provide this information on the City's website and at City Hall. This program will be included in the 2014-2021 Housing Element.

Goal 5: Identify adequate sites to achieve housing variety.	
Program	**Accomplishments**
Action 5.1 – Ensure Adequate Sites to Accommodate Allocated Regional Housing Growth **Objective:** Continue to provide appropriate land use designations and maintain an inventory of suitable sites for residential development. Make the vacant and underutilized residential sites inventory available on the City's website to non-profit and for-profit housing developers.	**Effectiveness:** Due to funding reductions and staff cutbacks the City was unable to complete the Zoning Code amendments in the time specified in the Housing Plan. In late 2012, the City initiated implementation of the proposed TOD overlay, including development standards to facilitate the development of a variety of housing types at densities appropriate to accommodate lower income housing construction. The City also established a new Multiple-Family 3 zone that allows residential development at 30 dwelling units per acre. Both the MF-3 zone and the TOD overlay were adopted by the City Council on October 15, 2013. **Appropriateness:** The City will continue to make available appropriate sites to accommodate their RHNA allocation. As adequate sites, with appropriate zoning to encourage and facilitate the development of a variety of housing opportunities, are available for the 2014-2021 planning period, and no rezoning is required, the City will modify the program to focus on maintaining their sites inventory and providing information to interested developers. This program will be included in the 2014-2021 Housing Element.
Action 5.2 – Provide Emergency and Transitional Housing **Objective:** Ensure that the housing need of all residents is met by providing opportunities for transitional housing, emergency shelters and SRO units to be accommodated within the City.	**Effectiveness:** Due to funding reductions and staff cutbacks the City was unable to complete the Zoning Code amendments in the time specified in the Housing Plan. In late 2012, the City drafted an ordinance amending the Zoning Code to allow emergency shelters in the Business Park (BP) Zone by right without any other discretionary permit required. The City also amended the Zoning Ordinance to allow transitional and supportive housing as a residential use, subject to the same requirements that apply to other residential uses in that same zone. This ordinance was adopted by the City Council on October 15, 2013. **Appropriateness:** As the City has completed the required rezoning to ensure that emergency and transitional housing opportunities are permitted, this program will be included in the 2014-2021 Housing Element as a program to monitor available sites.

Table 8-1: Summary of Housing Program Provisions and Achievement			
Program/Objective	Achieved	Partially Achieved	Not Achieved
Goal 1. Increased opportunities for affordable housing			
1.1. General Plan Review	X		
1.2. Land Use Database	X		
1.3. First Time Home Buyer Assistance		X	
1.4. Land and Property Acquisition	X		
1.5. Lot Consolidation	X		
1.6. Large Sites	X		
1.7. Housing for ELI Families	X		
Goal 2. Conservation of the City's existing housing stock			
2.1. Property Maintenance Enforcement	X		
2.2. Monitor Affordable Units	X		
2.3. Purchase Housing Covenants		X	
2.4. Neighborhood Stabilization Program	X		
2.5. Energy Efficient Design	X		
2.6. Riverside County Partnership	X		
Goal 3. Removal of constraints to the construction of affordable housing			
3.1. Density Bonus Ordinance	X		
3.2. Permit Processing Time	X		
3.3. Fee Subsidies	X		
3.4. Incentives for Large Multifamily Units	X		
3.5. Residential Development Standards	X		
3.6. Second Unit Ordinance	X		
3.7. Water and Sewer Providers	X		
3.8. Flood Management	X		
Goal 4. Equal housing opportunity			
4.1. Reasonable Accommodation	X		
4.2. Fair Housing	X		
4.3. Homeless Assistance	X		
4.4. Foreclosure Prevention	X		
Goal 5. Identification of adequate sites to achieve a variety and diversity of housing			
5.1. Adequate Sites to Accommodate the RHNA	X		
5.2. Emergency and Transitional Housing	X		

Appendix A: Parcel Specific Inventory

Appendix A provides supplemental data for the Housing Resources section. Included are tables providing detailed information about the vacant sites inventory for vacant residentially zoned sites and parcels included in the TOD Overlay Program area. In addition, Exhibit A-1 provides a map showing the vacant residentially zoned land appropriate to accommodate the City's moderate and above-moderate income RHNA and its location in the City. Exhibit A-2 provides a map showing the vacant residentially zoned land appropriate to accommodate the City's low and very-low income RHNA and its location in the City.

Table A-1: Inventory of Vacant Sites Zoned SF-1

Single Family-1 (SF-1)								
ID	APN	ACRES	ZONING	Z_ABBREV	DENSITY	UNIT CAPACITY	CURRENT USE	WATER/SEWER
1	384260020	4.4	Single-Family 1, Residential	SF-1	2.1-5 du/ac	18	Vacant	EMWD
2	384260030	4.2	Single-Family 1, Residential	SF-1	2.1-5 du/ac	17	Vacant	EMWD
4	906140049	4.7	Single-Family 1, Residential	SF-1	2.1-5 du/ac	19	Vacant	WMWD
5	906140070	9.2	Single-Family 1, Residential	SF-1	2.1-5 du/ac	37	Vacant	WMWD
6	910080001	4.9	Single-Family 1, Residential	SF-1	2.1-5 du/ac	20	Vacant	EMWD
7	910080002	1.0	Single-Family 1, Residential	SF-1	2.1-5 du/ac	4	Vacant	EMWD
8	910080003	1.3	Single-Family 1, Residential	SF-1	2.1-5 du/ac	5	Vacant	EMWD
9	910080004	0.6	Single-Family 1, Residential	SF-1	2.1-5 du/ac	2	Vacant	EMWD
10	910080005	1.0	Single-Family 1, Residential	SF-1	2.1-5 du/ac	4	Vacant	EMWD
11	910080006	1.0	Single-Family 1, Residential	SF-1	2.1-5 du/ac	4	Vacant	EMWD
12	910080007	1.0	Single-Family 1, Residential	SF-1	2.1-5 du/ac	4	Vacant	EMWD
13	910080008	0.5	Single-Family 1, Residential	SF-1	2.1-5 du/ac	2	Vacant	EMWD
14	910080009	0.3	Single-Family 1, Residential	SF-1	2.1-5 du/ac	1	Vacant	EMWD
15	910080010	0.5	Single-Family 1, Residential	SF-1	2.1-5 du/ac	2	Vacant	EMWD
16	910080011	0.2	Single-Family 1, Residential	SF-1	2.1-5 du/ac	1	Vacant	EMWD
17	910080012	0.2	Single-Family 1, Residential	SF-1	2.1-5 du/ac	1	Vacant	EMWD
18	910080013	0.3	Single-Family 1, Residential	SF-1	2.1-5 du/ac	1	Vacant	EMWD
19	910080014	0.5	Single-Family 1, Residential	SF-1	2.1-5 du/ac	2	Vacant	EMWD
20	910080015	0.5	Single-Family 1, Residential	SF-1	2.1-5 du/ac	2	Vacant	EMWD
21	910080016	0.5	Single-Family 1, Residential	SF-1	2.1-5 du/ac	2	Vacant	EMWD
22	910080017	0.5	Single-Family 1, Residential	SF-1	2.1-5 du/ac	2	Vacant	EMWD
23	910080018	0.5	Single-Family 1, Residential	SF-1	2.1-5 du/ac	2	Vacant	EMWD
24	910080019	0.5	Single-Family 1, Residential	SF-1	2.1-5 du/ac	2	Vacant	EMWD
25	910080020	0.3	Single-Family 1, Residential	SF-1	2.1-5 du/ac	1	Vacant	EMWD
26	910080021	1.8	Single-Family 1, Residential	SF-1	2.1-5 du/ac	7	Vacant	EMWD
27	910080022	0.5	Single-Family 1, Residential	SF-1	2.1-5 du/ac	2	Vacant	EMWD
28	910080023	0.5	Single-Family 1, Residential	SF-1	2.1-5 du/ac	2	Vacant	EMWD
29	910080024	0.9	Single-Family 1, Residential	SF-1	2.1-5 du/ac	4	Vacant	EMWD
31	916241015	5.2	Single-Family 1, Residential	SF-1	2.1-5 du/ac	21	Vacant	EMWD
32	916241016	1.0	Single-Family 1, Residential	SF-1	2.1-5 du/ac	4	Vacant	EMWD
33	948210005	2.4	Single-Family 1, Residential	SF-1	2.1-5 du/ac	10	Vacant	EMWD
34	948210007	2.5	Single-Family 1, Residential	SF-1	2.1-5 du/ac	10	Vacant	EMWD
35	949130016	2.5	Single-Family 1, Residential	SF-1	2.1-5 du/ac	10	Vacant	EMWD
36	949130017	5.0	Single-Family 1, Residential	SF-1	2.1-5 du/ac	20	Vacant	EMWD
37	949130018	2.1	Single-Family 1, Residential	SF-1	2.1-5 du/ac	8	Vacant	EMWD
38	949130019	3.0	Single-Family 1, Residential	SF-1	2.1-5 du/ac	12	Vacant	EMWD
39	949130020	2.7	Single-Family 1, Residential	SF-1	2.1-5 du/ac	11	Vacant	EMWD
40	949130021	2.9	Single-Family 1, Residential	SF-1	2.1-5 du/ac	11	Vacant	EMWD
41	949130055	0.2	Single-Family 1, Residential	SF-1	2.1-5 du/ac	1	Vacant	EMWD
42	949130056	0.2	Single-Family 1, Residential	SF-1	2.1-5 du/ac	1	Vacant	EMWD
43	949130057	0.3	Single-Family 1, Residential	SF-1	2.1-5 du/ac	1	Vacant	EMWD
44	949130058	1.3	Single-Family 1, Residential	SF-1	2.1-5 du/ac	5	Vacant	EMWD
45	949130062	0.3	Single-Family 1, Residential	SF-1	2.1-5 du/ac	1	Vacant	EMWD
46	949130064	0.3	Single-Family 1, Residential	SF-1	2.1-5 du/ac	1	Vacant	EMWD
47	949130066	1.7	Single-Family 1, Residential	SF-1	2.1-5 du/ac	7	Vacant	EMWD
TOTAL		76.0				304		

Table A-2: Inventory of Vacant Sites Zoned SF-2

Single Family-2 (SF-2)							
ID	APN	ACRES	ZONING	DENSITY	UNIT CAPACITY	CURRENT USE	WATER/SEWER
48	916070019	1.3	Single-Family 2, Residential	5.1-10 du/ac	11	Vacant	EMWD
49	910100001	13.7	Single-Family 2, Residential	5.1-10 du/ac	110	Vacant	EMWD
TOTAL		15.1			121		

Table A-3: Inventory of Vacant Sites Zoned MF-1

Multifamily Residential-1 (MF-1)							
ID	APN	ACRES	ZONING	DENSITY	UNIT CAPACITY	CURRENT USE	WATER/SEWER
50	908360004	6.1	Multi-Family 1, Residential	10-15 du/ac	73	Vacant	EMWD
51	906020013	4.9	Multi-Family 1, Residential	10-15 du/ac	59	Vacant	WMWD
52	906020086	4.5	Multi-Family 1, Residential	10-15 du/ac	54	Vacant	WMWD
53	906020012	4.9	Multi-Family 1, Residential	10-15 du/ac	59	Vacant	WMWD
TOTAL		20.4			244		

Table A-4: Inventory of Vacant Sites Zoned MF-2

Multifamily Residential-2 (MF-2)							
ID	APN	ACRES	ZONING	DENSITY	UNIT CAPACITY	CURRENT USE	WATER/SEWER
54	910430006	5.5	Multi-Family 2, Residential	15-18 du/ac	80	Vacant	EMWD
55	913160040	10.1	Multi-Family 2, Residential	15-18 du/ac	146	Vacant	EMWD
56	949090026	7.6	Multi-Family 2, Residential	15-18 du/ac	109	Vacant	WMWD
57	949090035	7.1	Multi-Family 2, Residential	15-18 du/ac	103	Vacant	WMWD
TOTAL		30.4			438		

Table A-5: Inventory of Vacant Sites Zoned MU-3

Mixed Use-3 (MU-3)							
ID	APN	ACRES	ZONING	DENSITY	UNIT CAPACITY	CURRENT USE	WATER/SEWER
58	392290010	5.7	Multiple Use, Area 3	15-18 du/ac	41	Vacant	EMWD
59	392290011	1.9	Multiple Use, Area 3	15-18 du/ac	14	Vacant	EMWD
60	392290015	4.7	Multiple Use, Area 3	15-18 du/ac	34	Vacant	EMWD
61	392290022	5.6	Multiple Use, Area 3	15-18 du/ac	40	Vacant	EMWD
62	392380069	2.4	Multiple Use, Area 3	15-18 du/ac	18	Vacant	EMWD
63	906040015	3.3	Multiple Use, Area 3	15-18 du/ac	24	Vacant	WMWD
64	906040021	0.8	Multiple Use, Area 3	15-18 du/ac	6	Vacant	WMWD
65	906040026	4.9	Multiple Use, Area 3	15-18 du/ac	35	Vacant	WMWD
66	906040091	0.7	Multiple Use, Area 3	15-18 du/ac	5	Vacant	WMWD
67	906040092	2.5	Multiple Use, Area 3	15-18 du/ac	18	Vacant	WMWD
68	906040093	2.2	Multiple Use, Area 3	15-18 du/ac	16	Vacant	WMWD
69	906040094	1.4	Multiple Use, Area 3	15-18 du/ac	10	Vacant	WMWD
70	906040095	2.6	Multiple Use, Area 3	15-18 du/ac	19	Vacant	WMWD
71	906060049	0.2	Multiple Use, Area 3	15-18 du/ac	2	Vacant	WMWD
72	906070092	3.9	Multiple Use, Area 3	15-18 du/ac	28	Vacant	WMWD
73	906070093	0.6	Multiple Use, Area 3	15-18 du/ac	4	Vacant	WMWD
74	909020048	0.8	Multiple Use, Area 3	15-18 du/ac	6	Vacant	WMWD
75	909040001	0.8	Multiple Use, Area 3	15-18 du/ac	6	Vacant	WMWD
76	909040002	0.2	Multiple Use, Area 3	15-18 du/ac	2	Vacant	WMWD
77	909040020	0.5	Multiple Use, Area 3	15-18 du/ac	3	Vacant	WMWD
78	909170004	0.6	Multiple Use, Area 3	15-18 du/ac	4	Vacant	WMWD
79	909170005	0.8	Multiple Use, Area 3	15-18 du/ac	6	Vacant	WMWD
80	909170006	0.3	Multiple Use, Area 3	15-18 du/ac	2	Vacant	WMWD
81	909170007	26.8	Multiple Use, Area 3	15-18 du/ac	193	Vacant	WMWD
82	909170008	1.0	Multiple Use, Area 3	15-18 du/ac	7	Vacant	WMWD
83	909170009	0.2	Multiple Use, Area 3	15-18 du/ac	1	Vacant	WMWD
84	909170012	1.8	Multiple Use, Area 3	15-18 du/ac	13	Vacant	WMWD
85	909170013	2.1	Multiple Use, Area 3	15-18 du/ac	15	Vacant	WMWD
86	909170014	1.7	Multiple Use, Area 3	15-18 du/ac	12	Vacant	WMWD
87	909170015	2.7	Multiple Use, Area 3	15-18 du/ac	20	Vacant	WMWD
88	913210032	2.8	Multiple Use, Area 3	15-18 du/ac	20	Vacant	EMWD
89	949110008	1.7	Multiple Use, Area 3	15-18 du/ac	12	Vacant	WMWD
90	949110009	1.7	Multiple Use, Area 3	15-18 du/ac	12	Vacant	WMWD
91	949110010	1.7	Multiple Use, Area 3	15-18 du/ac	12	Vacant	WMWD
92	949110011	1.6	Multiple Use, Area 3	15-18 du/ac	12	Vacant	WMWD
93	949110035	5.7	Multiple Use, Area 3	15-18 du/ac	41	Vacant	WMWD
94	949110036	6.6	Multiple Use, Area 3	15-18 du/ac	48	Vacant	WMWD
95	949220057	0.4	Multiple Use, Area 3	15-18 du/ac	3	Vacant	EMWD
96	949670009	2.2	Multiple Use, Area 3	15-18 du/ac	16	Vacant	EMWD
TOTAL		108.3			780		

Table A-6: Inventory of Vacant Sites Zoned MF-3

ID	APN	ACRES	PROPOSED ZONING	DENSITY	UNIT CAPACITY	CURRENT USE	WATER/ SEWER	FLOOD/ FAULT
SITE ONE								
1	909-030-032	1.05	Multi-Family 3, Residential	30 du/ac	31	Vacant	WMWD	No/Yes
1	909-030-033	1.04	Multi-Family 3, Residential	30 du/ac	31	Vacant	WMWD	No/Yes
Subtotal		2.09			62			
SITE TWO								
2	906-080-018	6.00	Multi-Family 3, Residential	30 du/ac	180	Vacant	WMWD	No/Yes
Subtotal		6.00			180			
TOTAL		**8.09**			**242**			

Table A-7: Inventory of Sites in TOD Overlay Program Area

APN	ACRES	UNDERLYING ZONING	UNIT CAPACITY	EXISTING USE/STRUCTURE		WATER/ SEWER	FLOOD/ FAULT
949-230-021	1.26	Civic/Institutional	0	Vacant	Flood Channel	WMWD	NO/NO
949-210-071	2.06	Community Commercial	62	Business and Underutilized	Retail	WMWD	NO/NO
910-410-008	4.71	Community Commercial	141	Business and Underutilized	Retail	WMWD	NO/NO
910-140-074	19.02	Community Commercial	571	Business and Underutilized	Retail	WMWD	NO/NO
949-670-002	1.35	Community Commercial	41	Business and Underutilized	Retail	WMWD	NO/NO
910-410-002	0.98	Community Commercial	29	Business and Underutilized	Retail	WMWD	NO/NO
910-410-006	0.37	Community Commercial	11	Business and Underutilized	Retail	WMWD	NO/NO
910-410-004	0.77	Community Commercial	23	Business and Underutilized	Retail	WMWD	NO/NO
949-670-003	0.96	Community Commercial	29	Business and Underutilized	Retail	WMWD	NO/NO
949-210-058	2.13	Community Commercial	64	Business and Underutilized	Retail	WMWD	NO/NO
949-670-004	1.42	Community Commercial	43	Business and Underutilized	Retail	WMWD	NO/NO
949-670-006	1.08	Community Commercial	32	Business and Underutilized	Retail	WMWD	NO/NO
949-210-070	2.21	Community Commercial	66	Business and Underutilized	Retail	WMWD	NO/NO
910-410-003	1.09	Community Commercial	33	Business and Underutilized	Retail	WMWD	NO/NO
949-670-005	0.69	Community Commercial	21	Business and Underutilized	Retail	WMWD	NO/NO
949-670-007	0.84	Community Commercial	25	Business and Underutilized	Retail	WMWD	NO/NO
910-410-001	1.02	Community Commercial	31	Business and Underutilized	Retail	WMWD	NO/NO
949-210-059	5.30	Community Commercial	159	Business and Underutilized	Retail	WMWD	NO/NO
910-410-007	0.78	Community Commercial	23	Business and Underutilized	Retail	WMWD	NO/NO
949-210-072	0.52	Community Commercial	16	Business and Underutilized	Retail	WMWD	NO/NO
949-180-034	2.30	Community Commercial	69	Residential Underutilized	Mobile Home	EMWD	NO/NO
949-670-008	1.63	Community Commercial	49	Vacant	Vacant	WMWD	NO/NO
910-140-044	10.21	Community Commercial	306	Vacant	Vacant	WMWD	NO/NO
910-410-011	17.99	Community Commercial	540	Vacant	Vacant	WMWD	NO/NO

APN	ACRES	UNDERLYING ZONING	UNIT CAPACITY	EXISTING USE/STRUCTURE		WATER/ SEWER	FLOOD/ FAULT
949-180-007	1.96	Community Commercial	59	Vacant	Vacant	EMWD	NO/NO
910-410-009	6.07	Community Commercial	182	Vacant	Vacant	WMWD	NO/NO
949-180-036	2.23	Community Commercial	67	Vacant	Vacant	EMWD	NO/NO
910-410-005	1.46	Community Commercial	44	Vacant	Vacant	WMWD	NO/NO
949-220-048	9.03	Multi-Family 2	271	Vacant	Vacant	WMWD	NO/NO
949-200-025	2.51	Multiple Use 1	75	Underutilized	Mobile Home	EMWD	NO/NO
949-200-013	1.77	Multiple Use 1	53	Underutilized	Storage Yard	EMWD	NO/NO
949-200-011	0.93	Multiple Use 1	28	Residential Underutilized	Mobile Home	EMWD	NO/NO
949-180-021	0.99	Multiple Use 1	30	Residential Underutilized	SF Home	EMWD	NO/NO
949-180-018	0.92	Multiple Use 1	28	Residential Underutilized	SF Home	EMWD	NO/NO
949-190-021	2.42	Multiple Use 1	73	Residential Underutilized	SF Home	EMWD	NO/NO
949-180-011	2.38	Multiple Use 1	71	Residential Underutilized	SF Home	EMWD	NO/NO
949-180-024	1.90	Multiple Use 1	57	Residential Underutilized	SF Home	EMWD	NO/NO
949-180-012	2.39	Multiple Use 1	72	Residential Underutilized	SF Home	EMWD	NO/NO
949-180-015	1.49	Multiple Use 1	45	Residential Underutilized	SF Home	EMWD	NO/NO
949-170-030	1.31	Multiple Use 1	39	Residential Underutilized	SF Home	EMWD	NO/NO
949-170-016	2.03	Multiple Use 1	61	Residential Underutilized	SF Home	EMWD	NO/NO
949-200-017	2.58	Multiple Use 1	77	Residential Underutilized	SF Home	EMWD	NO/NO
949-180-016	0.81	Multiple Use 1	24	Residential Underutilized	SF Home	EMWD	NO/NO
949-180-025	2.37	Multiple Use 1	71	Residential Underutilized	SF Home	EMWD	NO/NO
949-180-014	2.18	Multiple Use 1	65	Residential Underutilized	SF Home	EMWD	NO/NO
949-170-015	1.56	Multiple Use 1	47	Residential Underutilized	SF Home	EMWD	NO/NO
949-190-020	2.35	Multiple Use 1	71	Residential Underutilized	SF Home	EMWD	NO/NO
949-170-017	2.00	Multiple Use 1	60	Residential Underutilized	SF Home	EMWD	NO/NO
949-200-018	9.25	Multiple Use 1	278	Residential Underutilized	Metal Building	EMWD	NO/NO

APN	ACRES	UNDERLYING ZONING	UNIT CAPACITY	EXISTING USE/STRUCTURE		WATER/ SEWER	FLOOD/ FAULT
949-180-020	1.04	Multiple Use 1	31	Residential Underutilized	Mobile Home	EMWD	NO/NO
949-180-023	2.35	Multiple Use 1	71	Residential Underutilized	Mobile Home	EMWD	NO/NO
949-190-010	3.66	Multiple Use 1	110	Residential Underutilized	Mobile Home	EMWD	NO/NO
949-200-010	1.20	Multiple Use 1	36	Residential Underutilized	Mobile Home	EMWD	NO/NO
949-210-022	1.40	Multiple Use 1	42	Residential Underutilized	Mobile Home	EMWD	NO/NO
949-170-036	3.17	Multiple Use 1	95	Residential Underutilized	Vacant	EMWD	NO/NO
949-190-002	2.28	Multiple Use 1	68	Residential Underutilized	Metal Building	EMWD	NO/NO
949-200-023	2.13	Multiple Use 1	64	Residential Underutilized	Mobile Home	EMWD	NO/NO
949-190-023	2.27	Multiple Use 1	68	Residential Underutilized	Mobile Home	EMWD	NO/NO
949-180-022	1.18	Multiple Use 1	35	Residential Underutilized	SF Home	EMWD	NO/NO
949-190-008	2.45	Multiple Use 1	74	Residential Underutilized	Mobile Home	EMWD	NO/NO
949-200-027	0.87	Multiple Use 1	26	Vacant	Vacant	EMWD	NO/NO
949-170-035	1.91	Multiple Use 1	57	Underutilized	Mobile Home	EMWD	NO/NO
949-200-029	2.87	Multiple Use 1	86	Underutilized	Vacant	EMWD	NO/NO
949-200-012	1.11	Multiple Use 1	33	Underutilized	Mobile Home	EMWD	NO/NO
949-180-019	0.90	Multiple Use 1	27	Underutilized	SF Home	EMWD	NO/NO
949-190-018	2.18	Multiple Use 1	65	Underutilized	SF Home	EMWD	NO/NO
949-200-020	4.83	Multiple Use 1	145	Underutilized	Metal Building	EMWD	NO/NO
949-180-010	2.27	Multiple Use 1	68	Underutilized	Mobile Home	EMWD	NO/NO
949-200-019	0.45	Multiple Use 1	14	Underutilized	Metal Building	EMWD	NO/NO
949-200-028	1.39	Multiple Use 1	42	Underutilized	Mobile Home	EMWD	NO/NO
949-190-007	2.40	Multiple Use 1	72	Underutilized	SF Home	EMWD	NO/NO
949-200-022	2.07	Multiple Use 1	62	Underutilized	Mobile Home	EMWD	NO/NO
949-210-019	1.16	Multiple Use 1	35	Underutilized	Mobile Home	EMWD	NO/NO
949-210-018	1.00	Multiple Use 1	30	Underutilized	Mobile Home	EMWD	NO/NO
949-190-009	2.16	Multiple Use 1	65	Underutilized	Mobile Home	EMWD	NO/NO

APN	ACRES	UNDERLYING ZONING	UNIT CAPACITY	EXISTING USE/STRUCTURE		WATER/ SEWER	FLOOD/ FAULT
949-180-029	0.93	Multiple Use 1	28	Underutilized	Mobile Home	EMWD	NO/NO
949-190-004	2.35	Multiple Use 1	71	Underutilized	Mobile Home	EMWD	NO/NO
949-190-006	1.96	Multiple Use 1	59	Underutilized	Mobile Home	EMWD	NO/NO
949-190-001	2.25	Multiple Use 1	68	Underutilized	SF Home	EMWD	NO/NO
949-200-014	2.05	Multiple Use 1	62	Residential Underutilized	Mobile Home	EMWD	NO/NO
949-210-020	3.35	Multiple Use 1	101	Residential Underutilized	Mobile Home	EMWD	NO/NO
949-190-019	2.22	Multiple Use 1	67	Residential Underutilized	Mobile Home	EMWD	NO/NO
949-200-009	1.38	Multiple Use 1	41	Residential Underutilized	Mobile Home	EMWD	NO/NO
949-180-026	2.17	Multiple Use 1	65	Residential Underutilized	SF Home	EMWD	NO/NO
949-190-005	2.43	Multiple Use 1	73	Residential Underutilized	SF Home	EMWD	NO/NO
949-180-017	0.84	Multiple Use 1	25	Residential Underutilized	Mobile Home	EMWD	NO/NO
949-190-022	2.28	Multiple Use 1	68	Residential Underutilized	Mobile Home	EMWD	NO/NO
949-210-017	1.01	Multiple Use 1	30	Vacant	Vacant	EMWD	NO/NO
949-190-012	1.37	Multiple Use 1	41	Vacant	Vacant	EMWD	NO/NO
949-180-013	2.44	Multiple Use 1	73	Vacant	Vacant	EMWD	NO/NO
949-190-017	9.18	Multiple Use 1	275	Vacant	Vacant	EMWD	NO/NO
949-190-015	1.82	Multiple Use 1	55	Vacant	Vacant	EMWD	NO/NO
949-180-006	2.02	Multiple Use 1	61	Vacant	Vacant	EMWD	NO/NO
949-170-014	2.44	Multiple Use 1	73	Vacant	Vacant	EMWD	NO/NO
949-190-003	2.48	Multiple Use 1	74	Vacant	Vacant	EMWD	NO/NO
949-190-016	2.68	Multiple Use 1	80	Vacant	Vacant	EMWD	NO/NO
949-200-024	2.88	Multiple Use 1	86	Vacant	Vacant	EMWD	NO/NO
949-170-025	2.26	Multiple Use 1	68	Vacant	Vacant	EMWD	NO/NO
949-190-013	0.90	Multiple Use 1	27	Vacant	Vacant	EMWD	NO/NO
949-190-024	2.19	Multiple Use 1	66	Vacant	Vacant	EMWD	NO/NO

APN	ACRES	UNDERLYING ZONING	UNIT CAPACITY	EXISTING USE/STRUCTURE		WATER/ SEWER	FLOOD/ FAULT
949-210-021	0.44	Multiple Use 1	13	Vacant	Shed	EMWD	NO/NO
949-200-026	2.33	Multiple Use 1	70	Vacant	Vacant	EMWD	NO/NO
949-180-030	0.96	Multiple Use 1	29	Vacant	Vacant	EMWD	NO/NO
949-200-021	9.59	Multiple Use 1	288	Vacant	Vacant	EMWD	NO/NO
949-190-014	0.91	Multiple Use 1	27	Vacant	Vacant	EMWD	NO/NO
949-170-013	2.52	Multiple Use 1	76	Vacant	Vacant	EMWD	NO/NO
949-180-031	1.13	Multiple Use 1	34	Vacant	Vacant	EMWD	NO/NO
949-180-028	2.09	Multiple Use 1	63	Vacant	Vacant	EMWD	NO/NO
949-190-011	0.91	Multiple Use 1	27	Vacant	Vacant	EMWD	NO/NO
949-200-006	1.67	Multiple Use 1	50	Vacant	Vacant	EMWD	NO/NO
949-220-055	3.21	Multiple Use 3	96	Business and Underutilized	Retail	WMWD	NO/NO
949-220-054	7.43	Multiple Use 3	223	Business	Retail	WMWD	NO/NO
949-220-053	0.21	Multiple Use 3	6	Business	Retail	WMWD	NO/NO
949-220-047	0.73	Multiple Use 3	22	Business and Underutilized	Retail	WMWD	NO/NO
949-220-050	9.16	Multiple Use 3	275	Business	Retail	WMWD	NO/NO
949-220-026	1.39	Multiple Use 3	42	Business	Retail	WMWD	NO/NO
949-224-015	0.01	Multiple Use 3	0	Business	Office	WMWD	NO/NO
949-224-018	0.03	Multiple Use 3	1	Business	Office	WMWD	NO/NO
949-224-002	0.02	Multiple Use 3	1	Business	Office	WMWD	NO/NO
949-224-009	0.03	Multiple Use 3	1	Business	Office	WMWD	NO/NO
949-224-008	0.03	Multiple Use 3	1	Business	Office	WMWD	NO/NO
949-224-006	0.03	Multiple Use 3	1	Business	Office	WMWD	NO/NO
949-224-016	0.02	Multiple Use 3	1	Business	Office	WMWD	NO/NO
949-224-019	0.03	Multiple Use 3	1	Business	Office	WMWD	NO/NO
949-224-004	0.02	Multiple Use 3	1	Business	Office	WMWD	NO/NO
949-224-001	0.02	Multiple Use 3	1	Business	Office	WMWD	NO/NO

APN	ACRES	UNDERLYING ZONING	UNIT CAPACITY	EXISTING USE/STRUCTURE		WATER/ SEWER	FLOOD/ FAULT
949-224-011	0.03	Multiple Use 3	1	Business	Office	WMWD	NO/NO
949-224-013	0.02	Multiple Use 3	1	Business	Office	WMWD	NO/NO
949-224-007	0.03	Multiple Use 3	1	Business	Office	WMWD	NO/NO
949-224-003	0.02	Multiple Use 3	1	Business	Office	WMWD	NO/NO
949-224-010	0.03	Multiple Use 3	1	Business	Office	WMWD	NO/NO
949-224-017	0.03	Multiple Use 3	1	Business	Office	WMWD	NO/NO
949-224-012	0.03	Multiple Use 3	1	Business	Office	WMWD	NO/NO
949-224-021	1.95	Multiple Use 3	59	Business	Office	WMWD	NO/NO
949-220-051	0.24	Multiple Use 3	7	Business	Bank	WMWD	NO/NO
949-224-005	0.03	Multiple Use 3	1	Business	Office	WMWD	NO/NO
949-224-014	0.02	Multiple Use 3	1	Business	Office	WMWD	NO/NO
949-220-031	0.34	Multiple Use 3	10	Residential and Underutilized	Office	WMWD	NO/NO
949-224-020	0.03	Multiple Use 3	1	Business	Office	WMWD	NO/NO
949-220-014	0.62	Multiple Use 3	19	Residential and Underutilized	Office	WMWD	NO/NO
949-220-032	0.37	Multiple Use 3	11	Residential and Underutilized	Barn	WMWD	NO/NO
949-220-056	0.16	Multiple Use 3	5	Vacant	Vacant	WMWD	NO/NO
949-670-009	26.82	Multiple Use 3	805	Vacant	Vacant	WMWD	NO/NO
949-220-013	0.48	Multiple Use 3	14	Vacant	Barn	WMWD	NO/NO
949-180-035	0.16	Open Space	5	Vacant	Vacant	EMWD	NO/NO
949-180-037	0.16	Open Space	5	Vacant	Vacant	EMWD	NO/NO
910-250-008	2.65	Professional Commercial	80	Vacant	Vacant	EMWD	NO/NO
949-230-026	2.28	Regional Commercial	68	Business and Underutilized	Retail	WMWD	NO/NO
949-240-034	1.86	Regional Commercial	56	Business and Underutilized	Retail	WMWD	NO/NO
949-240-031	0.58	Regional Commercial	17	Business and Underutilized	Retail	WMWD	NO/NO
949-240-028	0.80	Regional Commercial	24	Business and Underutilized	Retail	WMWD	NO/NO

APN	ACRES	UNDERLYING ZONING	UNIT CAPACITY	EXISTING USE/STRUCTURE		WATER/ SEWER	FLOOD/ FAULT
949-240-027	0.72	Regional Commercial	22	Business and Underutilized	Retail	WMWD	NO/NO
949-230-020	4.56	Regional Commercial	137	Business and Underutilized	Retail	WMWD	NO/NO
949-240-033	0.48	Regional Commercial	14	Business and Underutilized	Retail	WMWD	NO/NO
949-240-036	1.40	Regional Commercial	42	Business and Underutilized	Retail	WMWD	NO/NO
949-230-027	2.60	Regional Commercial	78	Business and Underutilized	Retail	WMWD	NO/NO
949-230-001	4.81	Regional Commercial	144	Business and Underutilized	Retail	WMWD	NO/NO
949-240-035	0.17	Regional Commercial	5	Business and Underutilized	Retail	WMWD	NO/NO
949-230-031	0.47	Regional Commercial	14	Business and Underutilized	Retail	WMWD	NO/NO
949-240-032	3.10	Regional Commercial	93	Business and Underutilized	Retail	WMWD	NO/NO
949-230-029	0.54	Regional Commercial	16	Business and Underutilized	Retail	WMWD	NO/NO
910-031-022	0.49	Regional Commercial	15	Vacant	Vacant	EMWD	NO/NO
910-031-024	1.03	Regional Commercial	31	Vacant	Vacant	EMWD	NO/NO
910-031-023	1.04	Regional Commercial	31	Vacant	Vacant	EMWD	NO/NO
910-031-002	0.51	Regional Commercial	15	Vacant	Vacant	EMWD	NO/NO
910-031-011	0.50	Regional Commercial	15	Vacant	Vacant	EMWD	NO/NO
910-031-003	0.99	Regional Commercial	30	Vacant	Vacant	EMWD	NO/NO
910-031-018	1.00	Regional Commercial	30	Vacant	Vacant	EMWD	NO/NO
910-031-006	0.50	Regional Commercial	15	Vacant	Vacant	EMWD	NO/NO
910-031-020	1.42	Regional Commercial	43	Vacant	Vacant	EMWD	NO/NO
910-031-004	1.01	Regional Commercial	30	Vacant	Vacant	EMWD	NO/NO
910-031-008	1.01	Regional Commercial	30	Vacant	Vacant	EMWD	NO/NO
910-031-001	0.50	Regional Commercial	15	Vacant	Vacant	EMWD	NO/NO
910-031-021	0.81	Regional Commercial	24	Vacant	Vacant	EMWD	NO/NO
910-031-017	1.00	Regional Commercial	30	Vacant	Vacant	EMWD	NO/NO
910-031-010	0.50	Regional Commercial	15	Vacant	Vacant	EMWD	NO/NO

APN	ACRES	UNDERLYING ZONING	UNIT CAPACITY	EXISTING USE/STRUCTURE		WATER/ SEWER	FLOOD/ FAULT
910-031-025	0.76	Regional Commercial	23	Vacant	Vacant	EMWD	NO/NO
910-031-015	0.94	Regional Commercial	28	Vacant	Vacant	EMWD	NO/NO
910-031-026	0.86	Regional Commercial	26	Vacant	Vacant	EMWD	NO/NO
910-031-009	2.03	Regional Commercial	61	Vacant	Vacant	EMWD	NO/NO
910-031-007	0.51	Regional Commercial	15	Vacant	Vacant	EMWD	NO/NO
910-031-005	0.99	Regional Commercial	30	Vacant	Vacant	EMWD	NO/NO
TOTAL	**78.0**		**2,340**				

* At least 50 percent of the remaining very low and low income need will be accommodated on sites designated exclusively for residential uses.

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Exhibit A-1: Sites to Accommodate the Moderate and Above Moderate RHNA Allocation

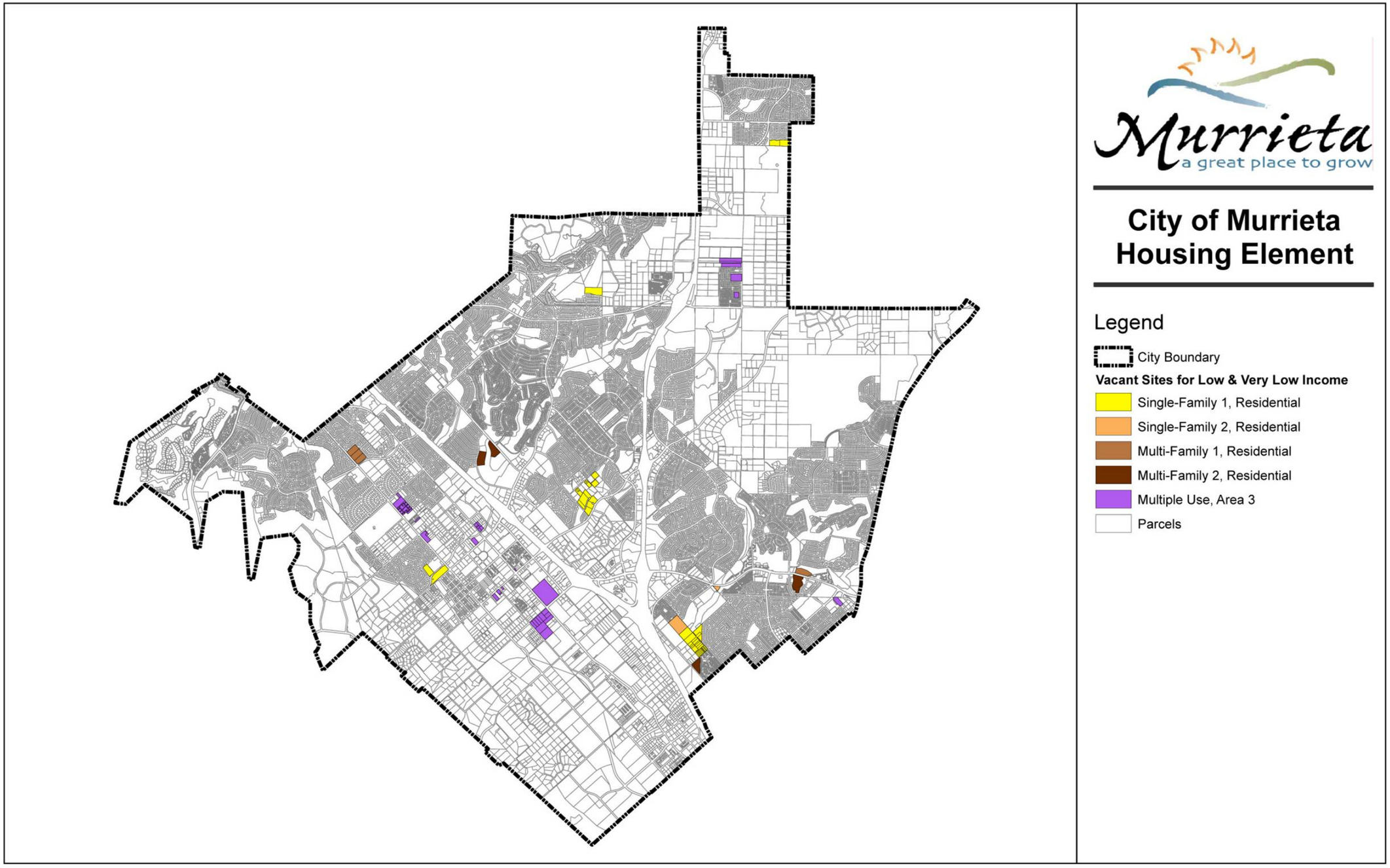

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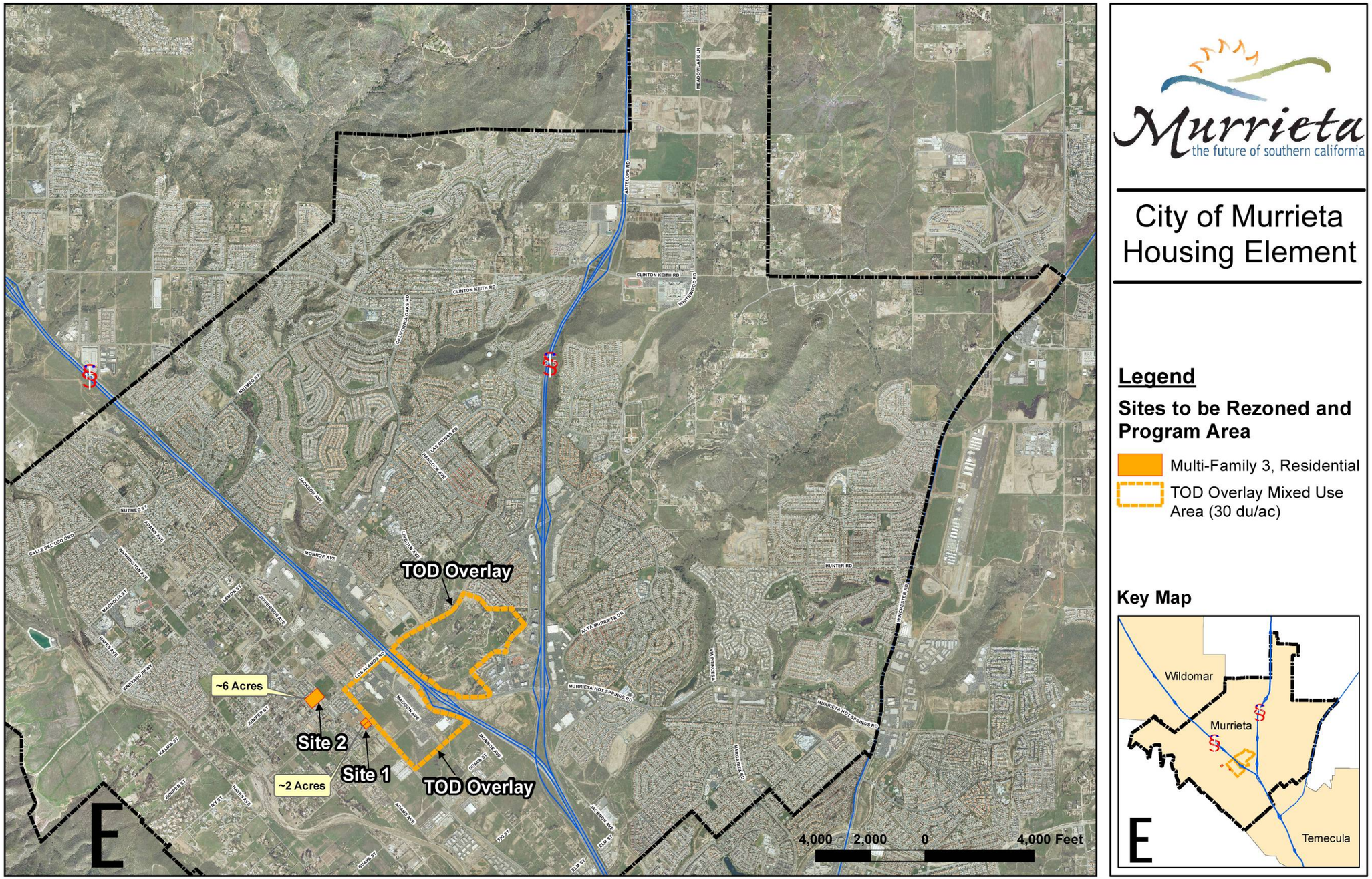
Exhibit A-2: Sites to Accommodate the Lower Income RHNA Allocation



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Appendix B: Housing Affordability

Appendix B includes a letter from Affirmed Housing Group (AHG) addressing densities appropriate to develop affordable housing in the City of Murrieta. AHG states that the current maximum density of 18 dwelling units allowed in the MF-2 and MU-3 zones is sufficient to build not only very low- and low-income units but also units for extremely low-income households. The Appendix also includes a sample pro forma that was completed for 36 multi-bedroom units on 2 acres of land in Downtown indicating that the organization will still make a profit by constructing at 18 dwelling units per acre.

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tel 858.679.2828 • fax 858.679.9075 • web affirmedhous.rg.com

AFFIRMED
HOUSING GROUP

April 1, 2010

Dorothy Farmer
Senior Management Analyst
Community Development Department
City of Murrieta
24601 Jefferson Avenue
Murrieta, CA 92562

Re: Affordable Development Feasibility at 18DU/acre

Dear Dorothy:

Affirmed Housing Group (AHG), established in 1994, develops and owns affordable apartment communities throughout California. Our current portfolio includes 23 apartment communities and over 2,200 units, and we currently have more than 600 new units in the development pipeline. In 2005, we completed our 64 unit Monte Vista Apartments on Jefferson in Murrieta, and over the past two years we have been actively pursuing development of our second affordable project in Murrieta.

AHG has analyzed multiple sites in the general vicinity of Jefferson and Juniper, ranging in size from 2 – 6 acres. The attached proforma illustrates a potential development recently analyzed by AHG. Based on current property values, projects can be underwritten at the current multi-family zoning density standard of 18 dwelling units per acre, and do not necessarily require the 1.35 density bonus allowable by SB1818 to be financially viable.

To the extent property values do not increase significantly, the 18 DU/acre density will continue to be sufficient to allow for development of affordable apartments, and the available 1.35 density bonus will extend the viability of this density even with moderate increases in property acquisition costs. Significant increases in property costs will likely require an increase in per-unit contribution by the City. For developments on City owned property, affordable developments will remain viable at an 18DU/acre density.

Please do not hesitate to contact me if further clarification of this issue is needed.

Cordially,

Lindsay Quackenbush
Vice President of Development

13520 Evening Creek Drive North • Suite 360 • San Diego, California 92128

Proposed Family Apartments - 36 Units

9% + RDA +County + Land + Def Dev Fee

SOURCES

		Per Unit	Percent Total
Conventional Permanent Loan	$ 1,020,001	$ 28,333	9.6%
Murrieta RDA	$ 2,000,000	$ 55,556	18.9%
County of Riverside	$ 968,000	$ 26,889	9.2%
Low Income Housing Tax Credits	$ 5,268,882	$ 146,358	49.8%
City Land Contribution	$ 1,320,000	$ 36,667	12.5%
Deferred Developer Fee	$ -	$ -	0.0%
TOTAL SOURCES	**$ 10,576,883**	**$ 293,802**	100.0%

USES

Land Acquisition	$ 1,320,000	$ 36,667	12.5%
Demolition	$ -	$ -	0.0%
On & Off Site Work	$ 756,000	$ 21,000	7.1%
Direct Construction	$ 4,545,280	$ 126,258	43.0%
Construction & Soft Cost Contingency	$ 367,970	$ 10,221	3.5%
Architecture	$ 505,000	$ 14,028	4.8%
Civil Engineer	$ 350,000	$ 9,722	3.3%
Construction/predev. Loan Interest & Fees	$ 282,000	$ 7,833	2.7%
Site Security	$ 72,000	$ 2,000	0.7%
Capitalized Reserves	$ 89,633	$ 2,490	0.8%
Taxes & Insurance	$ 85,000	$ 2,361	0.8%
Escrow & Title	$ 20,000	$ 556	0.2%
Legal Fees	$ 40,000	$ 1,111	0.4%
Development Impact Fees & Permits	$ 828,000	$ 23,000	7.8%
Tax Credit Fees	$ 48,000	$ 1,333	0.5%
Environmental Consultants	$ -	$ -	0.0%
Misc. Soft Costs (Accounting, Appraisal, Furnishir	$ 93,000	$ 2,583	0.9%
Developer Fee	$ 1,175,000	$ 32,639	11.1%
TOTAL USES	**$ 10,576,883**	**$ 293,802**	100.0%

RDA contribution per affordable unit: $ 57,143

Tiebreaker 65.68%

INCOME

Type	Qty.	Subtotal	% AMI	Rental Income Gross	Net	Total
1BR	2		30%	$ 374	$ 328	$ 656
1BR	2		40%	$ 499	$ 453	$ 906
1BR	6		50%	$ 624	$ 578	$ 3,468
1BR	2	12	60%	$ 749	$ 703	$ 1,406
2BR	1		30%	$ 435	$ 376	$ 376
2BR	1		40%	$ 599	$ 540	$ 540
2BR	8		50%	$ 726	$ 667	$ 5,336
2BR	2		60%	$ 871	$ 812	$ 1,624
2BR Mgr	0	12	n/a	$ -	$ -	$ -
3BR	1		30%	$ 484	$ 412	$ 412
3 BR	1		40%	$ 692	$ 620	$ 620
3BR	4		50%	$ 806	$ 734	$ 2,936
3BR	6	12	60%	$ 968	$ 896	$ 5,376
TOTAL	**36**	36		**TOTAL**		**$ 23,656**

Annual Residential Income	$ 283,872
Other Income	$ 5,706
Vacancy	$ (14,479)
ANNUAL INCOME	**$ 275,099**

EXPENSES

	per unit	
General Admin. (security, office equip., accounting)	$ 472	$ 17,000
Management Fee	$ 473	$ 17,032
Utilities (water, sewer, gas, electric)	$ 556	$ 20,000
On-Site Manager & Maintenance Payroll	$ 944	$ 34,000
Property Taxes & Prop./Liab./Earthquake Ins.	$ 250	$ 9,000
Maintenance & Grounds	$ 528	$ 19,000
Partnership Management	$ 417	15,000
Resident Services	$ 278	$ 10,000
Replacement Reserves	$ 250	$ 9,000
Property Taxes	$ 694	$ 25,000
ANNUAL EXPENSES	$ 4,862	**$ 175,032**

Monte Vista 2 - 36 units 09-1014 $2M from City, 65.68% TB.lq.xls

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Appendix C: Community Participation

This appendix contains the following materials to illustrate the City's effort to conduct quality community outreach efforts with regard to the Housing Element update process:

1. Meeting flyer
2. Sample Stakeholder letter
3. List of Stakeholders contacted

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City of Murrieta Housing Element

The City of Murrieta is in the process of updating the State-required Housing Element.

Please join us at the upcoming community workshop events:

Murrieta
the future of southern california

Planning Commission
Wednesday, February 13, 2013
6:00 pm

City Council
Tuesday, March 5, 2013
5:00 pm

Both events will be held at:

Council Chamber of Murrieta City Hall
1 Town Square
Murrieta, CA 92562

Included in this workshop will be:

- Purpose and intent of the Housing Element
- Why and how often the Housing Element is updated
- The contents of the Housing Element
- The process for adoption
- Benefits of Housing Element certification

If you have any questions or would like additional information, please contact Nancy Driggers at (951) 461-6008 or Cynthia Kinser at (951) 461-6069 or visit the Community Development Department located in Murrieta City Hall.

January 17, 2013

CITY OF MURRIETA

Women's Health Assistance Program
41785 Elm St., #305,
Murrieta, CA 92562

Subject: Community Workshops for the City of Murrieta 2014-2021 Housing Element Update

To Whom It May Concern:

The City of Murrieta cordially invites you to two upcoming community workshops to discuss and present the 2014-2021 Housing Element update. These community events are intended to provide information to the City Council, Planning Commission and general public about the General Plan Housing Element update, and to answer any questions regarding the Housing Element and the update process. In addition, we would like to gather input from residents, City leaders, and interested stakeholders on housing issues and concerns that should be addressed in the Housing Element update. The workshops will be held during regularly scheduled Planning Commission and City Council meetings:

Planning Commission	**City Council**
Wednesday, February 13, 2013 6:00 p.m. Council Chamber of City Hall 1 Town Square Murrieta, CA 92562	Tuesday, March 5, 2013 5:00 p.m. Council Chamber of City Hall 1 Town Square Murrieta, CA 92562

The Housing Element is one component of the City's General Plan, the City's long-range plan for land use in the community. The Housing Element identifies housing specific needs in Murrieta and describes the approaches the City will take to facilitate meeting those needs.

If you have questions or would like additional information, please contact Cynthia Kinser by telephone at (951) 304-2489 or visit the Planning Division of the Community Development Department at www.murrieta.org/cityhall/cd/planning/default.asp

If you cannot attend the meeting and would like to comment, please forward written comments to Nancy Driggers at the City Manager's Office, located at Murrieta City Hall, 1 Town Square, Murrieta, CA 92562.

Enclosed with this letter are flyers that provide information about the community workshop. Please distribute and post these flyers at your earliest convenience. Thank you.

Sincerely,

Nancy Driggers
Assistant to the City Manage

1 Town Square • Murrieta, California 92562
phone: 951.304.CITY (2489) • fax: 951.698.4509 • web: murrieta.org

Table C-1: Stakeholder List

Organization Name	Address	City	State	Zip
Abode Communities	701 East 3rd Street, Suite 400	Los Angeles	CA	90013
Abode Communities	702 East 3rd Street, Suite 400	Los Angeles	CA	90014
Affirmed Housing Group	13520 Evening Creek Drive North #160	San Diego	CA	92128
California Housing Partnership Corporation	28545 Old Town Front Street, Suite 205	Temecula	CA	92591
Coachella Valley Housing Coalition	45-701 Monroe Street, Suite G	Indio	CA	92201
Community Food Pantry of Murrieta	39793 Avenida Acacias	Murrieta	CA	92563
Fair Housing Council	3933 Mission Inn Avenue	Riverside	CA	92501
Family Support Program	4601 Jefferson Street	Murrieta	CA	92562
Housing and Homeless Coalition for Riverside County	4060 County Circle Drive	Riverside	CA	92503
Jamboree Housing Corporation	17701 Cowan Avenue	Irvine	CA	92614
Long Beach Affordable Housing Coalition, Inc	5855 Naples Plaza, Suite 209	Long Beach	CA	90803
National Community Renaissance (CORE)	9065 Haven Avenue, Suite#100	Rancho Cucamonga	CA	91730
Neighborhood Housing Services of the Inland Empire, Inc	1390 North D Street	San Bernardino	CA	92405
Riverside County Economic Development Agency	3403 10th Street, Suite 500	Riverside	CA	92501
Riverside County Housing Authority	5555 Arlington Ave	Riverside	CA	92504
Riverside County Office on Aging	6296 River Crest Drive, Suite K	Riverside	CA	92507
Safe Alternatives for Everyone	28816 Pujol Street	Temecula	CA	92590
San Diego Interfaith Housing Foundation	7956 Lester Ave	Lemon Grove	CA	91945
Senior Citizens Service Center Inc.	41538 Eastman Drive # C	Murrieta	CA	92562
Southern California Association of Non-Profit Housing	3345 Wilshire Boulevard, Suite 1005	Los Angeles	CA	90010
Southern California Presbyterian	1875 North "D" Street	San Bernardino	CA	92405
St Martha Catholic Church	37200 Whitewood Road	Murrieta	CA	92563
St. Vincent de Paul Village, San Diego	1501 Imperial Avenue	San Diego	CA	92101
The Boys and Girls Club - S.W. County	40550 California Oaks Road	Murrieta	CA	92562
Women's Health Assistance Program	41785 Elm St., #305,	Murrieta	CA	92562

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Murrieta General Plan 2035 Implementation Plan

INTRODUCTION

The General Plan contains a set of goals describing what Murrieta wishes to achieve, and policies that it has adopted to support those goals. Most of these goals and policies are stated in general terms, and there are a number of ways that they may be carried out in practice.

This implementation plan provides specific action items that the City may undertake in order to achieve the General Plan goals. It is intended to be updated annually by the City when it reports to the State on the progress that has been made in implementation. Although the Community Development Department has primary responsibility for maintaining this implementation plan, implementation of General Plan 2035 is the ongoing responsibility of all City departments.

LAND USE ELEMENT

Discussion

Future development and redevelopment within Murrieta will primarily be guided by private property owners. In certain instances, implementation of the Land Use Element will require the coordination of federal, state and regional planning bodies. Water Management, Public Safety, Airport safety and other related planning considerations will require coordination and compliance with mandates established by other agencies.

The City's Development Code is the primary tool for implementing the General Plan, providing regulating standards, identification of permitted uses, and other regulations that support the proper implementation of the General Plan Land Use Element. The Development Code establishes and manages the use and design of future development by providing detailed descriptions for the use of property and site development standards (e.g., building heights and setbacks, parking standards, etc.) Subsequent to the adoption of the General Plan, the Development Code shall be amended to ensure consistency with the policies described in the Land Use Element.

Implementation Actions

Short-Term Actions (0-2 years)			
Action	**Description**	**Responsibility**	**Related Policies**
LU-A1	***High Speed Rail Liaison.*** Designate a liaison to the California High Speed Rail Authority to explore the benefits and demands of locating a high-speed rail station in Murrieta, in coordination with the Riverside Transit Authority and City of Temecula.	Public Works & Engineering/ Community Development	LU-8.9, 18.2; CIR-5.11
LU-A2	***Los Alamos Hills Specific Plan.*** Assist Los Alamos Hills property owners in the development of a consensus-based Specific Plan.	Community Development	LU-13.11, 13.12, 13.13
LU-A3	***Development Code Consistency.*** Amend the Development Code to be consistent with the General Plan.	Community Development	LU-20.1
LU-A4	***Neighborhood Associations.*** In neighborhoods where there are no HOAs, encourage the formation of neighborhood associations that can help to promote property maintenance, using Neighborhood Watch groups as a starting point.	Police	LU-3.1, 11.4, 27.4

Mid-Term Actions (3-5 years)			
Action	**Description**	**Responsibility**	**Related Policies**
LU-A6	***Lot Consolidation/Parcel Assemblage.*** Explore options for incentivizing lot consolidation and parcel assemblage in Focus Areas.	Community Development	LU-7.7
LU-A7	***Shared Parking and Access Incentives.*** Explore options for incentivizing shared parking and reciprocal access agreements.	Community Development	LU-7.8; CIR-1.10
LU-A8	***Mixed Use Zoning Districts.*** Amend the Development Code to implement mixed use zoning districts that provide development standards for mixed use development, as well as to create walkability.	Community Development	LU-8.7, 10.5
LU-A9	***Business Corridor Design Guidelines.*** Create design guidelines for the North Murrieta Technical Corridor and South Murrieta Business Corridor.	Community Development	LU-9.2, 9.6, 10.1, 11.2, 11.3, 11.7, LU-11.9, LU-11.10
LU-A10	***Street Master Plan.*** Consider preparation and adoption of a Street Master Plan that provides "complete street" standards for multi-modal transportation connections, while incorporating "green street" stormwater capture features and street tree standards.	Community Development	LU-10.2, CSV-3.4, CSV-9.2, CIR-1.11, CIR-2.12

Ongoing Actions			
Action	**Description**	**Responsibility**	**Related Policies**
LU-A11	***Land Use Coordination.*** Coordinate on land use issues with adjacent jurisdictions and other affected agencies including the California Department of Transportation, Riverside County Transportation Commission, County of Riverside, Local Agency Formation Commission, Riverside County Airport Land Use Commission, Riverside County Flood Control and Water Conservation District, and Army Corps of Engineers.	Community Development	LU-18.3, 18.4, 18.5, 18.7, 18.8, 25.1, 25.2

ECONOMIC DEVELOPMENT ELEMENT

Discussion

Implementation of the Economic Development Element requires coordination between the City of Murrieta, adjacent and regional jurisdictions, and local businesses and residents. There are a number of activities that assist and contribute to the implementation of the Element. Murrieta recognizes that economic development is a challenge accepted by several local agencies and that the full scope of possible implementation approaches does not fall on any single entity. The City will implement the Economic Development Element through public/private actions and policies. A key component will be to establish priorities for policy implementation and monitoring the progress of the implementation. Overall, the City must maintain flexibility due to the dynamic nature of our market-based economy.

Implementation Actions

Short-Term Actions (0-2 years)			
Action	**Description**	**Responsibility**	**Related Policies**
ED-A1	***Medical/Health Industry.*** Refine the economic development recruitment strategy to prioritize recruitment of medical- or health-related businesses, capitalizing on the new Loma Linda University Medical Center, Kaiser Permanente, and Rady Children's Hospital.	Economic Development	ED-3.2
ED-A2	***Tech Start-Up Collaborative.*** Form collaborative group with area universities to pursue a technology incubator/start-up program.	Economic Development	ED-3.6, 3.7
ED-A3	***Business Retention and Expansion.*** Partner with the Chamber of Commerce to establish a Business Retention and Expansion program that assists businesses with needs such as resolving regulatory issues, identifying sites for relocation, hiring, training, and obtaining financing.	Economic Development	ED-8.5, 8.9
ED-A4	***Focus Area Vision Promotion.*** Create marketing materials showcasing the General Plan 2035's emphasis on economic development with an emphasis on the areas designated as Innovation and communicating the vision for Murrieta's focus areas to developers, targeted industries, higher educational institutions, and regional partners.	Economic / Community Development	ED-8.11
ED-A5	***Education and Workforce.*** Create a forum for dialogue between local institutions of higher education and local business leaders about matching programs to employer needs.	Economic Development	ED-6.3

Mid-Term Actions (3-5 years)			
Action	**Description**	**Responsibility**	**Related Policies**
ED-A6	***Fiscal Impact Analysis.*** Formalize requirements for fiscal impact analysis of development projects.	Finance Department	ED-2.3
ED-A7	***Public Facilities Financing Program.*** Create a program for long-range public facilities financing for projects that provide community benefits.	Public Works & Engineering	ED-2.7
ED-A8	***Madison Avenue Corridor Strategy.*** Create a unified urban design, marketing, and imaging strategy to strengthen the Madison Avenue commercial corridor.	Community Development	ED-4.5
ED-A9	***Higher Education Partnership.*** Form a partnership with other cities in Southwest Riverside County to recruit a California State University campus and pursue other institutions of higher education.	City Manager	ED-6.1
Ongoing Actions			
Action	**Description**	**Responsibility**	**Related Policies**
ED-A10	***Economic Development Strategy.*** Maintain and update the City's Economic Development Strategy.	Economic Development	None
ED-A11	***Fiscal Health Review.*** Conduct periodic reviews of the City's fiscal policy, fiscal revenue and cost structure, and development impact and processing fees.	Finance Department	ED-2.1, 2.5, 2.9

CIRCULATION ELEMENT

Discussion

Implementation of the Circulation Element involves several City departments including, but not limited to, Public Works & Engineering, Community Development, and Community Services Departments. Traffic impact analysis requirements for individual development projects would continue to be used to effectively determine the impact potential of development projects on the circulation system, and define appropriate mitigation measures which adequately address project impacts. Continued maintenance and updates/refinements of inputs to the City's Buildout Traffic Model will allow the City to monitor the effect of on-going development approvals on ultimate circulation system needs. The City's Capital Improvement Program (CIP) will continue to be used to identify and plan for infrastructure improvements, including new or upgraded facilities and the maintenance of existing facilities.

There are a variety of funding sources and mechanisms the City would consider to fund infrastructure improvements including, but not limited to, Development Impact Fees, Transportation Uniform Mitigation Fee (TUMF) and Grant Funds, as well as other State and County funding programs.

Implementation Actions

Short-Term Actions (0-2 years)			
Action	**Description**	**Responsibility**	**Related Policies**
CIR-A1	***Safe Routes to Schools.*** Assist in the creation of a Safe Routes To Schools task force in collaboration with school districts and other community partners.	Community Development/Public Works & Engineering	CIR-2.11, 2.13
CIR-A2	***Highway 395 Corridor.*** Coordinate with the Cities of Temecula, Wildomar, and Lake Elsinore on preparation of a transportation plan for the Jefferson Avenue Corridor.	Community Development/ Public Works & Engineering	CIR-5.3
CIR-A3	***Residential Development Standards.*** Revise development standards to require pedestrian access from the interior of new residential areas to public transit stops.	Community Development	CIR-7.2
CIR-A4	***Bikeway and Trail Map.*** Maintain a map or maps of current bikeways and multi-use trails, and make the map(s) available to the public.	Community Services/Public Works & Engineering/GIS	CIR-8.13
CIR-A5	***Transportation Commission.*** Consider changing the name of the "Traffic Commission" to the "Transportation Commission," and revise its scope to explicitly address all forms of transportation including automobile, bicycle, pedestrian, public transportation, and ADA enhancements.	Public Works & Engineering	CIR-8.15
CIR-A6	***Bicycle Parking and Storage.*** Update the City's parking requirements in the Development Code to require bicycle parking and storage for all new development or redevelopment projects.	Community Development/Building & Safety	CIR-9.6

Mid-Term Actions (3-5 years)			
Action	**Description**	**Responsibility**	**Related Policies**
CIR-A7	***Complete Street Standards.*** Consider developing a set of "complete street" standards for different types of streets, including transit corridors, residential collectors, and roadways in less urbanized areas.	Community Development/Public Works & Engineering	CIR-1.11, 2.3, 2.5, 6.6, 6.8
CIR-A8	***Enhanced Intersection Geometrics.*** Identify and evaluate the major intersections requiring special design treatment to increase their vehicular capacity.	Public Works & Engineering	CIR-1.8
CIR-A9	***Truck Traffic Restrictions.*** Review current goods movement patterns and determine if possible restrictions on hours of truck traffic may reduce impacts to area streets.	Public Works & Engineering	CIR-1.14
CIR-A10	***Traffic Calming Pilot Project.*** Identify candidate locations for implementing traffic calming measures and implement a demonstration project.	Public Works & Engineering	CIR-2.6
CIR-A11	***Pedestrian and Bicycle Design.*** Consider the development of guidelines and standards that increase pedestrian and bicycle safety, create better connections between adjacent land uses, and encourage the installation of pedestrian amenities in appropriate areas.	Community Development/Public Works & Engineering	CIR-2.12, 7.4, 7.5, 7.7, 8.3, 8.6, 8.8
CIR-A12	***Key Interchanges.*** Actively pursue the construction of the French Valley Parkway connector system, south of the I-15/1-215 confluence, as well as a new east-west corridor and interchange at Keller Road.	Public Works & Engineering	CIR-5.4, 5.5
CIR-A13	***Transit-Adjacent Development.*** Consider creating incentives for new developments to locate on existing and planned transit routes, such as reduced parking requirements.	Community Development	CIR-5.14, 9.4

Long-Term Actions (6+ years)			
Action	**Description**	**Responsibility**	**Related Policies**
CIR-A14	***Traffic Calming Guidelines.*** Consider the development and implementation of Traffic Calming Guidelines to address safety within residential neighborhoods.	Community Development/Public Works & Engineering	CIR-2.6, 3.4, 3.5
CIR-A15	***Travel/Commute Survey.*** Work with the Riverside Transit Agency and Murrieta Chamber of Commerce to conduct a travel/commute survey with the intent of creating vanpools, carpools, and employment center shuttles to reduce single occupant vehicles.	Economic Development	CIR-6.3
CIR-A16	***Non-Motorized Transportation Plan.*** Create, update, and implement a master plan for non-motorized travel throughout the City, including multi-use trails, off-street paved bikeways, on-street bikeways, and related amenities.	Community Development/Community Services/Public Works & Engineering	CIR-8.1
Ongoing Actions			
Action	**Description**	**Responsibility**	**Related Policies**
CIR-A17	***Circulation Element Evaluation.*** Evaluate the Circulation Element roadway plan on a regular basis using the City of Murrieta Traffic Model.	Public Works & Engineering	CIR-1.7

INFRASTRUCTURE ELEMENT

Discussion

Most of the infrastructure discussed in this Element is built and maintained by entities operating independently of the City of Murrieta. However, the City supports water, sewer, and storm water infrastructure by collecting impact fees from new development. The City has the most direct influence over the construction and maintenance of storm drains, and can direct the construction of other storm water infrastructure in private developments. Larger flood control efforts require coordination with Riverside County Flood Control and Water Conservation District, as well as the U.S. Army Corps of Engineers and neighboring jurisdictions. The City's role in ensuring the provision of water and sewer services is to coordinate land use planning with the water agencies providing those services, and encourage annexation of areas not yet within the service areas of water districts. For those facilities under the City's jurisdiction, it is important that the City's Capital Improvement Program include provisions for new or upgraded facilities, as well as the maintenance of facilities.

Electricity and gas service is provided by utilities on a development-by-development basis, and the City requires new development to verify that service will be available. The City can also contribute to future energy supplies by facilitating efforts to generate renewable energy locally.

Implementation Actions

Mid-Term Actions (3-5 years)			
Action	**Description**	**Responsibility**	**Related Policies**
INF-A1	***Storm Drain Impact Fees.*** Assess whether impact fees are sufficient to provide needed storm drain infrastructure.	Public Works & Engineering	INF-1.11
INF-A2	***Recycled Water to City Parks.*** Begin discussions with EMWD to explore expanding recycled water pipelines to serve California Oaks Sports Park and Town Square.	Community Services/Public Works & Engineering	INF-2.2, INF-2.5, CSV-15.5

Mid-Term Actions (3-5 years)			
Action	**Description**	**Responsibility**	**Related Policies**
INF-A3	***LID Guidelines.*** Incorporate Low Impact Development principles into new design guidelines, including opportunities for groundwater recharge.	Community Development/Public Works & Engineering	INF-1.17, INF-1.18, INF-2.5, CSV-3.2, CSV-3.3
INF-A4	***Infrastructure Financing in Business Corridors.*** Convene property owners to discuss options for financing mechanisms, such as financing districts, to provide infrastructure and maintenance in the North Murrieta Technical Corridor and South Murrieta Business Corridor.	Community Development	INF-1.22
INF-A5	***Groundwater Recharge in Parks.*** Seek opportunities to incorporate groundwater recharge features into park designs.	Community Services/Public Works & Engineering	INF-2.5
Long-Term Actions (6+ years)			
Action	**Description**	**Responsibility**	**Related Policies**
INF-A6	***Water District Annexation.*** Work with water districts to intensify efforts to annex property owners into their service areas.	Community Development	INF-1.3
Ongoing Actions			
Action	**Description**	**Responsibility**	**Related Policies**
INF-A7	***Communication with Water Districts.*** Maintain communication with the water districts serving Murrieta, sharing information about proposed development, and seeking ways to facilitate the provision of water and wastewater infrastructure.	Community Development/Public Works & Engineering	INF-1.6, INF-1.8, INF-1.9, INF-1.10
INF-A8	***Stormwater Education.*** Maintain efforts to educate businesses and residents about Best Management Practices for stormwater.	Public Works & Engineering	INF-1.14, INF-1.15

HEALTHY COMMUNITY ELEMENT

Discussion

The topic of Healthy Community crosses all areas of City government, and implementation will require coordination between a number of City departments, including Community Development, Economic Development, Public Works, and the Community Services District.

The Community Development Department and other relevant departments will review the City's existing codes and ordinances (including the Development Code and the Building Code) and make recommendations on how they can be improved to create more positive health outcomes in the City.

The Economic Development Department will pursue a program of incentives and outreach to attract health care related facilities and businesses to the City. The Economic Development Department will also explore incentives to 1) maintain or expand existing or 2) locate and establish new grocery stores and other healthy food purveyors, and to the extent possible, strive for an equal distribution of healthy food stores throughout the City.

The City can lead by example by expanding the Healthy Murrieta program and by developing City-sponsored programs to address employee health for city employees. Suggested programs could include healthy lifestyle challenges, exercise challenges, lunchtime exercise programs, sponsoring bike and walk to work days, and providing transit passes for employees.

Implementation Actions

Mid-Term Actions (3-5 years)			
Action	**Description**	**Responsibility**	**Related Policies**
HC-A1	***Health Impact Checklist.*** Seek assistance from the Riverside County Department of Public Health in creating a checklist or other guidelines that can assist in considering community health impacts of policy decisions and programs.	Community Development	HC-1.2, 2.1, 2.3, 2.5
HC-A2	***City Employee Wellness.*** Investigate the feasibility of implementing an employee wellness program, which could reduce health insurance costs and sick days; information on such programs is available from the Healthy Eating Active Living (HEAL) Cities Campaign.	City Manager	HC-1.4, 1.5
HC-A3	***Healthy Murrieta Program.*** Assign staff, as resources are available, responsibility for expanding the Healthy Murrieta program, with an initial emphasis on promoting health at community events and among local businesses.	City Manager	HC-1.4, 2.4, 5.4, 6.4, 6.5
HC-A4	***Green Technology Incubator.*** Conduct a green technology business incubator feasibility study.	Economic Development	HC-5.2; AQ-6.3
HC-A5	***Healthy Food Retail Incentives.*** Explore incentives such as the Healthy Food Financing Initiative or California FreshWorks Fund to expand healthy food retail throughout Murrieta.	Economic Development	HC-6.3

Mid-Term Actions (3-5 years)			
Action	**Description**	**Responsibility**	**Related Policies**
HC-A6	***Health Care Coordination.*** Assist the Riverside County Department of Health in convening local health care providers and school districts to identify possible gaps in local health care, and find opportunities to reach more community members.	Community Development	HC-2.2, 2.6, 8.1, 8.2, 8.3
HC-A7	***Smoking Ban Enforcement.*** Begin a program to regularly enforce the City's smoking bans.	Police	HC-3.1
Long-Term Actions (6+ years)			
Action	**Description**	**Responsibility**	**Related Policies**
HC-A8	***Public Art Ordinance.*** Consider adopting a public art ordinance that 1) provides incentives for businesses to provide public art and 2) establishes a fee for commercial and industrial projects that do not wish to install public art.	City Manager	HC-4.6
Ongoing Actions			
Action	**Description**	**Responsibility**	**Related Policies**
HC-A9	***Communication with County Department of Public Health.*** Maintain a relationship with the Riverside County Department of Public Health to keep up with best practices in local health promotion and identify resources for plans and programs.	Community Development	HC-1.1, 2.3
HC-A10	***"Healthy Home" Education.*** Disseminate information to property owners and tenants about maintaining a "healthy home," including information about indoor mold and low toxicity cleaning products; look to the CDC and California Department of Public Health for resources.	Building & Safety	HC-3.2; AQ-1.5
HC-A11	***Healthy Eating Classes.*** Offer community classes that promote healthy eating.	Community Services	HC-6.6
HC-A12	***Environmental Justice.*** Consider environmental justice issues and potential health impacts associated with land use decisions.	Community Development	HC- 2.7, HC-2.8, HC-2.9, HC-2.10. HC- 2.11, HC-2.12, HC-2.13, HC-2.14

CONSERVATION ELEMENT

Discussion

Natural resources are shared across jurisdictions and, therefore, conservation of these resources is an effort that is best accomplished through cooperative efforts between cities, counties, and various agencies. As called out in this Element, multi-jurisdictional plans pertaining to conservation include the Upper Santa Margarita Integrated Regional Water Management Plan (IRWMP) and Western Riverside Multiple Species Habitat Conservation Plan (MSHCP). Although implemented by public entities, both plans have implications for private development in Murrieta.

A number of City ordinances exist that promote conservation of natural and cultural resources in Murrieta through the regulation of private activity. These regulations are largely carried out through the development review process and development agreements. The Cultural Resources Ordinance requires proactive measures by the City of Murrieta Historic Preservation Advisory Commission in order to recognize and preserve historical and archaeological resources.

Businesses and residents in Murrieta are the end users of most resources, and they can be stewards as well. Education and outreach efforts to these community members by the City and its partners such as utility providers will go a long way toward conservation of Murrieta's valuable resources. The City of Murrieta can implement changes in its own operations to set an example for these efforts.

Implementation Actions

Short-Term Actions (0-2 years)			
Action	**Description**	**Responsibility**	**Related Policies**
CSV-A1	***Commercial Recycling Program.*** Implement a commercial recycling program to meet new state requirements per AB 341.	City Manager	None
CSV-A2	***Creek Restoration Funding.*** Investigate the feasibility of pursuing a Proposition 84 Urban Greening grant for creek restoration.	Public Works & Engineering /Community Services	CSV-4.6
CSV-A3	***MSHCP Implementation Program.*** Establish an implementation program to clarify procedures for implementation of the Western Riverside Multiple Species Habitat Conservation Plan (MSHCP) Habitat Acquisition Negotiation Strategy (HANS) in the City and to provide incentives to facilitate conservation with the MSHCP while recognizing private property rights.	Community Development	CSV-8.7
CSV-A4	***Preferred Landscaping Guide.*** Identify a guide to preferred trees, shrubs, and ground cover plants that property owners can reference for their landscaping projects, such as the Metropolitan Water District's California Friendly Garden Guide.	Community Development	CSV-9.6
CSV-A5	***On-Site Solar Installation Standards.*** Consider creating standards for on-site solar power installations.	Community Development	CSV-12.3, CSV-12.4, CSV-12.5, CSV 12.9, CSV 12.10
CSV-A6	***Renewable Energy on City Property.*** Investigate options for generating renewable energy on City property.	Public Works & Engineering	CSV-15.1

Mid-Term Actions (3-5 years)			
Action	**Description**	**Responsibility**	**Related Policies**
CSV-A7	***Landscaping Guidelines.*** Incorporate landscaping regulations into design guidelines, along with language that encourages street tree planting, tree preservation, and the use of native plant species.	Community Development/ Community Services	CSV-2.5, CSV-9.3, CSV-9.4, CSV-9.8, CSV-9.9, CSV 9.10
CSV-A8	***Energy Conservation/Generation Guidelines.*** Incorporate language into design guidelines that encourages energy conservation and on-site renewable energy generation.	Community Development/ Community Services	CSV-12.6
CSV-A9	***Recreation Facility Green Features.*** Seek opportunities to incorporate green building features and water-efficient landscaping into recreation facilities.	Community Services	CSV-15.4, CSV-15.6, CSV-15.7
Long-Term Actions (6+ years)			
Action	**Description**	**Responsibility**	**Related Policies**
CSV-A10	***Promotion of Landscaping Requirements.*** Consider streamlining municipal regulations pertaining to landscaping or producing educational materials to help property owners understand requirements.	Community Development	CSV-2.5
CSV-A11	***Library Archivist/Historian.*** Identify funding to reinstate and maintain a archivist/historian staff position at the Murrieta Public Library.	Library	CSV-11.4, CSV-11.7
CSV-A12	***Citywide Composting Program.*** Promote resources to the development and promotion of a citywide composting program.	City Manager	CSV-13.5, CSV-13.6, CSV-13.7

Ongoing Actions			
Action	**Description**	**Responsibility**	**Related Policies**
CSV-A13	***Cultural Resource Designation.*** Promote the designation of eligible resources to the City Register of Cultural Resources.	Community Development	CSV-11.3
CSV-A14	***Historic Elements in Parks.*** Seek opportunities to incorporate historic elements into park designs.	Community Services	CSV-11.8
CSV-A15	***"Greening" Municipal Operations.*** Continue reducing waste generation, and energy and water consumption, in municipal operations.	City Manager	CSV-15.1, CSV-15.2, CSV-15.3, CSV-15.4, CSV-15.5, CSV-15.6, CSV 15.7

RECREATION & OPEN SPACE ELEMENT

Discussion

The Recreation and Open Space Element is a policy document that requires the ongoing effort and actions of many segments of the community to implement. The Planning Commission and City Council, as major decision-making bodies, play an important role in its implementation. Other responsible parties include such City departments as the Community Development Department, Building Department, Public Works, and Community Service, whose day-to-day decisions are guided by the public policies in this document and the actions of the Community Services Commission.

The business and development community will do a fair share of the implementation as they incorporate plan policies into their various interests and projects. Murrieta residents should also be engaged in planning and providing for recreation and open space.

The City of Murrieta Parks and Recreation Master Plan is the implementation document that will guide City investments in parks and recreation.

Implementation Actions

Short-Term Actions (0-2 years)			
Action	**Description**	**Responsibility**	**Related Policies**
ROS-A1	***Parkland Expansion.*** Using the Parks Master Plan as a guide, create a strategy for providing sufficient parkland to accommodate needed recreation facilities.	Community Services	ROS-1.2
ROS-A2	***Joint Use Gymnasiums.*** Explore amending the joint use agreement to expand community use of school gymnasiums for recreation programming and open hours.	Community Services	ROS-2.2, 3.1
ROS-A3	***Open Space Requirements.*** Review and modify as necessary, open space requirements for different types of development projects.	Community Development	ROS-9.5

Mid-Term Actions (3-5 years)			
Action	**Description**	**Responsibility**	**Related Policies**
ROS-A4	***Program Space Development.*** Pursue the development of community center space for recreation programs, as part of planned expansions of Murrieta parks.	Community Services	ROS-2.1, 2.2
ROS-A5	***Volunteer Program.*** Consider a volunteer program that provides regular opportunities for community volunteers and youth in rehabilitation programs to assist with beautification, cleanup, and trail maintenance in public parks and open space.	Community Services	ROS-3.7, 5.4
ROS-A6	***Physical Activity Guidelines.*** Ensure that new design guidelines for residential and commercial developments promote physical activity through provisions for pathways, bicycle facilities, and recreation facilities.	Community Development	ROS-8.3, 9.1, 9.2
Long-Term Actions (6+ years)			
Action	**Description**	**Responsibility**	**Related Policies**
ROS-A7	***Master Plan Update.*** Comprehensively update the Parks Master Plan to keep up with population growth, demographic changes, and development of recreation facilities.	Community Services	None
Ongoing Actions			
Action	**Description**	**Responsibility**	**Related Policies**
ROS-A8	***Joint Use Facility Development.*** Continue to pursue joint development of new recreation facilities in partnership with Murrieta Valley School District.	Community Services	ROS-3.1, 3.2
ROS-A9	***Private Facilities.*** Actively recruit private entities to provide needed recreation facilities.	Community Services	ROS-3.4
ROS-A10	***Outside Funding.*** Consider staff responsibility for research and pursuit of grants, and consider contracting with a grants specialist.	Community Services	ROS-3.6
ROS-A11	***Community Involvement.*** Provide for community involvement in the planning process for recreation facilities and programs, using such tools as surveys, online polling, focus groups, and workshops, as well as continuing to seek input from the Youth Advisory Committee.	Community Services	ROS-1.4, 4.1, 6.4, 6.5

AIR QUALITY ELEMENT

Discussion

To meet State and Federal air quality goals requires commitment and involvement by all jurisdictions within the South Coast Air Basin. Protecting public health is a mutual goal shared by Murrieta, as well as other jurisdictions located within the Basin. Although an individual agency does not have the authority or jurisdiction to implement air quality measures for the larger region, local governments do have the legal authority and responsibility to direct policies and actions within their community. The City of Murrieta has established a policy program that addresses air quality through new development and balanced growth; land use compatibility; and coordination and compliance with regulatory agencies and new regulations/requirements. The responsibility of implementing the goals and policies of the Air Quality Element are assigned to the City's Community Development Department, and in some instances, this authority is shared with the South Coast Air Quality Management District (SCAQMD) and the South California Association of Governments (SCAG).

Implementation Actions

Short-Term Actions (0-2 years)			
Action	**Description**	**Responsibility**	**Related Policies**
AQ-A1	***Freeway Buffer Map.*** Create a map showing a 500-foot buffer around the I-215 and I-15 freeways and avoid locating new homes, schools, childcare and elder care facilities, and health care facilities within this buffer.	Community Development	AQ-2.2, AQ-2.4, AQ-2.5, AQ-2.6, AQ-2.7, AQ-2.8, AQ-2.9, AQ-2.10
AQ-A2	***Contractor Emissions.*** Consider amending the Municipal Code to provide a preference to contractors using reduced emission equipment.	Public Works & Engineering	AQ-5.5
Mid-Term Actions (3-5 years)			
Action	**Description**	**Responsibility**	**Related Policies**
AQ-A3	***Indoor Air Quality Guidelines.*** Incorporate techniques for improved indoor air quality into design guidelines for developments near freeways, major corridors, and other sources causing high levels of localized air pollution.	Community Development	AQ-2.5, AQ-2.7, AQ-2.8, AQ-2.10, AQ-6.5, AQ-6.7
AQ-A4	***Green Building Recognition.*** Consider creating a program recognizing local achievements in green building, in partnership with local business interests and realtors.	Economic Development	AQ-6.6

Long-Term Actions (6+ years)			
Action	**Description**	**Responsibility**	**Related Policies**
AQ-A5	***Employer Transportation Demand Management(TDM) Measures.*** Consider reducing parking requirements for industrial or office developments that require tenants to implement transportation demand management measures.	Community Development	AQ-5.1
AQ-A6	***Neighborhood Electric Vehicle s (NEV) Plan.*** Explore options for WRCOG to create another multi-city Neighborhood Electric Vehicles Transportation Plan for Murrieta and its neighbors, which would allow the use of NEVs on low-speed city streets.	Community Development	AQ-5.3
AQ-A7	***Industrial Truck Facilities.*** Revise the Development Code to include measures that reduce truck idling.	Community Development	AQ-5.7
Ongoing Actions			
Action	**Description**	**Responsibility**	**Related Policies**
AQ-A8	***Maintaining Compliance.*** Review and update City regulations and/or requirements, as needed, based on improved technology and new regulations including updates to the Air Quality Management Plan (AQMP), rules and regulations from South Coast Air Quality Management District (SCAQMD), and revisions to SCAQMD's CEQA Guidelines.	Community Development	AQ-1.2

NOISE ELEMENT

Discussion

Noise is generated by a variety of sources throughout the City. Protecting public health is a priority for Murrieta. The goals and policies of the Noise Element will be implemented by several City departments including, but not limited to, Community Development, Building, and Code Enforcement. Individual development projects and activities will be reviewed to determine whether the proposed use will have an impact on existing and proposed uses within the vicinity. Project review will include the analysis of land use patterns, compliance with Noise Ordinance requirements, and may include project-specific noise studies. Code enforcement activities include responding/investigation noise complaints and noise monitoring. Through coordinated efforts of all City departments, Murrieta will maintain acceptable noise levels for all residents and businesses.

Implementation Actions

Short-Term Actions (0-2 years)			
Action	**Description**	**Responsibility**	**Related Policies**
N-A1	***Rubberized Asphalt.*** Assess the feasibility of using rubberized asphalt for new roadways or roadway rehabilitation projects to achieve possible benefits of noise reduction and cooler roadway temperatures.	Public Works & Engineering	N-3.5
Mid-Term Actions (3-5 years)			
Action	**Description**	**Responsibility**	**Related Policies**
N-A2	***Mixed Use Noise Guidelines.*** Incorporate noise control techniques into design guidelines for mixed use areas.	Community Development	N-2.7, N-2.8, N-2.9,N- 2.10
N-A3	***Freeway-Adjacent Noise Guidelines.*** Incorporate noise control techniques into design guidelines for freeway-adjacent properties in the North and South Murrieta Business Corridors.	Community Development	N-3.3
Long-Term Actions (6+ years)			
Action	**Description**	**Responsibility**	**Related Policies**
N-A4	***Highway Noise Abatement.*** Work with Caltrans to achieve maximum noise abatement in the design of new highway projects or improvements, including the use of noise barriers.	Public Works & Engineering	N-3.1,N- 3.2,N-3.3

Ongoing Actions			
Action	**Description**	**Responsibility**	**Related Policies**
N-A5	***Noise Ordinance Maintenance.*** Review and update the Noise Ordinance to ensure that noise exposure information and specific policies and regulations are current.	Community Development	N-2.1

SAFETY ELEMENT

Discussion

Ensuring safety in Murrieta begins with understanding the hazards that are present. Maintaining current information and maps of hazards provides a basis for Citywide planning, while site-specific analysis is often needed to evaluate geologic and seismic hazards.

Land use policy in the General Plan and Municipal Code will guide efforts to limit damage from known hazards. Project review provides another opportunity to prevent harm to new developments and their inhabitants. Inspections and code enforcement promote compliance with City codes for building and fire safety, as well as hazardous materials handling. Engineering can mitigate geologic and seismic hazards.

Multiple levels of government are involved in safety. The City must follow State and Federal laws and abide by County plans. The City coordinates with agencies from the County to Federal level in planning, enforcement, and emergency response.

The Emergency Operations Plan is intended to coordinate the City response to major emergencies. Under the EOP, emergency response is managed by the Emergency Operations Center, headed by the Fire Division Chief. However, multiple City departments have implementation responsibility for the EOP.

Responses to smaller-scale emergencies are handled every day by Murrieta Fire & Rescue (MFR) and the Police Department, which have the combined capacity to handle emergencies caused by any of the hazards described in the Safety Element — or at least to initiate a response, as in the case of hazardous materials accidents.

Members of the public and business community are important partners in maintaining safety, whether they are helping to prevent crime or preparing to respond appropriately in the event of an emergency. The Police and MFR offer many opportunities for community members to become directly involved in public safety with programs such as the Youth Accountability Board and CERT.

Implementation Actions

Short-Term Actions (0-2 years)			
Action	**Description**	**Responsibility**	**Related Policies**
SAF- A1	***Murrieta Creek Flooding.*** In partnership with Temecula, continue the pursuit of funding for the Murrieta Creek Flood Control, Environmental Restoration and Recreation Project.	City Manager/ Public Works & Engineering	SAF-3.2, CSV-4.5
SAF- A2	***Evacuation Plans.*** Develop and maintain evacuation plans for floodplain inundation and dam failure in cooperation with the Riverside County Flood Control and Water Conservation District.	Fire	SAF-3.5, SAF-4.2
SAF-A3	***Development Fees.*** Propose new development fees that will provide for adequate fire and police protection as the city grows, and that allow these departments to meet their service level targets.	City Manager, Police, Fire	SAF-6.1,SAF-SAF- 6.3, SAF-SAF- 6.4, SAF-SAF- 6.5, SAF-9.1, SAF- 9.2, SAF- 9.5, SAF-9.6
SAF- A4	***Police Field Stations.*** Assess whether Police Department field stations are a cost-effective way to meet target response times and other Department goals, and identify options for developing field stations including co-location.	Police	SAF-9.3
SAF-A5	***Emergency Operations Staff.*** Assign staff responsibility for maintaining the Emergency Operations Plan and conducting training and exercises.	City Manager	SAF-12.1, SAF-12.2, SAF- 12.3, SAF- 12.4, SAF-12.6
Mid-Term Actions (3-5 years)			
Action	**Description**	**Responsibility**	**Related Policies**
SAF-A6	***Emergency Medical Dispatch.*** Evaluate the feasibility and benefits of incorporating Emergency Medical Dispatch into the dispatching system.	Fire	SAF-6.6
SAF- A7	***Crime Prevention Though Environmental Design (CPTED) Guidelines.*** Promote use of CPTED principles by creating design guidelines for multi-family development and incorporating CPTED principles into other design guidelines, with input from the Police Department.	Community Development, Police	SAF-11.1, SAF-11.3
Long-Term Actions (6+ years)			
Action	**Description**	**Responsibility**	**Related Policies**
SAF-A8	***East: Murrieta Fire Response.*** Track the effectiveness of the automatic and mutual aid agreements to provide an effective response force and total response times in eastern Murrieta as the area grows, and assess whether a sixth fire station is needed.	Fire	SAF-6.5, SAF-6.10, SAF- 6.11

Ongoing Actions			
Action	**Description**	**Responsibility**	**Related Policies**
SAF-A9	***Development Review.*** Seek input from Fire and Police during the review of development proposals.	Community Development	SAF-1.5, SAF-5.4, SAF- 5.6, SAF- 5.7, SAF-11.1, CIR-2.14
SAF-A10	***Safety Education.*** Partner with Community Services to promote community education opportunities for safety and emergency preparedness—through awareness campaigns, safety education or materials at community events, and classes.	Fire	SAF-1.7, SAF-5.2, SAF- 12.5
SAF-A11	***Murrieta Fire & Rescue Strategic Plan.*** MFR shall maintain a Strategic Plan and Community Risk Assessment – Standards of Cover.	Fire	SAF-6.8
SAF-A12	***Wildfire Education.*** **Provide** education about wildfire protection and evacuation to homeowners in areas near the wildland/urban interface, through realtors and homeowners associations.	Fire	SAF-7.4
SAF-A13	***Household Hazardous Waste Events.*** Promote County-sponsored household hazardous waste disposal events held in Murrieta.	Fire/City Manager	SAF-8.5, SAF-8.7
SAF-A14	***Police Department Strategic Plan.*** Develop, maintain, and implement a Police Department Strategic Plan.	Police	SAF-9.4

HOUSING ELEMENT

Discussion

The Housing Element has its own five-year action plan, as mandated by state law. Please refer to the Housing Plan section of the Housing Element.

APPENDIX I
Draft Zoning Code

Title 16
DEVELOPMENT CODE

Article I - Development Code Enactment and Applicability
- **16.01 Purpose and Effect of Development Code**
- **16.02 Development and Land Use Approval Requirements**
- **16.04 Interpretation of Code Provisions**

Article II - Zoning Districts and Allowable Land Uses
- **16.06 Establishment of Zoning Districts, Adoption of Zoning Map**
- **16.08 Residential Districts**
- **16.10 Commercial Districts**
- **16.11 Office Districts**
- **16.12 Business Park and Industrial Districts**
- **16.13 Innovation District**
- **16.14 Special Purpose Districts**
- **16.16 Combining and Overlay Districts**

Article III - Site Planning and General Development Standards
- **16.18 General Property Development and Use Standards**
- **16.20 Affordable Housing Incentives/Density Bonus Provisions**
- **16.22 Fences, Hedges, and Walls**
- **16.24 Hillside Development**
- **16.26 Cultural Resource Preservation**
- **16.28 Landscaping Standards and Water Efficient Landscaping**
- **16.30 Noise**
- **16.32 Nonconforming Uses, Structures, and Parcels**
- **16.34 Off-Street Parking and Loading Standards**
- **16.36 Public Facilities/Infrastructure Mitigation**
- **16.38 Sign Standards**
- **16.40 Transportation Demand Management**
- **16.42 Tree Preservation**
- **16.44 Standards for Specific Land Uses**

Article IV - Administration
- **16.46 Administrative Responsibility**
- **16.48 Application Filing, Processing, and Fees**
- **16.50 Agricultural Preserves and Land Conservation Contract Actions**
- **16.52 Conditional Use Permits**
- **16.54 Development Agreements**
- **16.56 Development Plan Permits**
- **16.58 General Plan, Zoning Map, and Development Code Amendments**
- **16.60 Home Occupation Permits**
- **16.62 Large Family Day Care Permits**
- **16.64 Master Development Plans**
- **16.66 Specific Plans**
- **16.68 Surface Mining Permits**
- **16.70 Temporary Use Permits**

G. Conflicting Permits and Licenses to be Void. Permits or licenses shall be issued by the city in compliance with the provisions of this development code, after the effective date of this development code or amendment. Permits or licenses issued in conflict with this development code shall be void.
(Ord. 202 § 2 (part), 1999; Ord. 182 § 2 (part), 1997)

16.01.070 Responsibility for Administration.

This development code shall be administered by the Murrieta city council, planning commission, development services director, and the Murrieta development services department, in compliance with 16.46 (Administrative Responsibility).
(Ord. 182 § 2 (part), 1997)

16.01.080 Partial Invalidation of Development Code.

If any article, chapter, section, subsection, paragraph, subparagraph, sentence, clause, phrase or portion of this development code is held to be invalid, unconstitutional or unenforceable by a court of competent jurisdiction, these decisions shall not affect the validity of the remaining portions of this development code. The Murrieta city council hereby declares that this development code and each article, chapter, section, subsection, paragraph, sub-paragraph, sentence, clause, phrase or portion would have been adopted irrespective of the fact that one or more portions of this development code may be declared invalid, unconstitutional or unenforceable.
(Ord. 182 § 2 (part), 1997)

16.02 Development and Land Use Approval Requirements

Sections:

16.02.010 Requirements for Development and New Land Uses.
16.02.020 Exemptions from Land Use Permit Requirements.
16.02.030 Temporary Uses.
16.02.040 Additional Permits or Approvals May be Required.

16.02.010 Requirements for Development and New Land Uses.

No use of land or structures shall be established, constructed, reconstructed, altered, expanded, allowed or replaced unless the use of land or structures complies with the following requirements.

A. Allowable Use. The land use shall be identified by 16.08 (Residential Districts), 16.10 (Commercial Districts), 16.11 (Office Districts), 16.12 (Business Park and Industrial Districts), 16.13 (Innovation District), 16.14 (Special Purpose Districts), or 16.16 (Combining and Overlay Districts) as being allowable in the zoning district applied to the site.

Table 16.06-1 ZONING DISTRICTS	
Zoning Map Symbol	**Zoning District Name**
MF-3	Multiple Family 3 Residential, minimum 30 d.u./acre
Commercial	
NC	Neighborhood Commercial
CC	Community Commercial
RC	Regional Commercial
Office	
O	Office
ORP	Office Research Park
Business Park and Industrial	
BP	Business Park
GI	General Industrial
GI-A	General Industrial A
Innovation	
INN	Innovation
Other Zoning Districts	
P&R	Parks and Recreation
OS	Open Space
C & I	Civic & Institutional
Combining and Overlay Districts	
MPO	Master Plan Overlay
TOD	Transit Oriented Development Overlay District

(Ord. 492 Exhibit 3, 2014; Ord. 482-13 § 2, 2013; Ord. 182 § 2 (part) 1997)

16.06.020 Zoning Map Adopted.

b. Standard: Overly bright colors (e.g., day-glo) and intricate patterns of color (e.g., checkerboard) shall be avoided.

(Ord. 538, Exhibit A (part), 2018; Ord. 492 Exhibit 7, 2014; Ord. 202 § 2 (part), 1999; Ord. 182 § 2 (part), 1997)

16.13 Innovation District

Sections:

16.13.010 Purpose.
16.13.020 Innovation District General Development Standards
16.13.030 Innovation District Design Standards
16.13.040 Innovation District Design Standard Exhibits

16.13.010 Purpose.

This chapter provides regulations applicable to development and land uses in the Innovation zoning district (INN) established by 16.06.010 (Zoning Districts Established). The Innovation zoning district is applied to areas appropriate primarily for business and medical offices, corporate headquarters, medical services, business campuses with associated research and development facilities, education, technological advancement, makers labs such as people using digital tools to design new products, and craftsman products such as furniture and window design/construction. A limited amount of commercial uses are allowed within the Innovation zoning district. Examples of allowable commercial uses include: businesses that sell products made in facilities on-site, restaurants that support the employment and primary uses, and hotels. Commercial businesses are intended as support services for the employees and customers of the office, business, and medical uses with their associated research and development operations. The Innovation zoning district provides for a limited amount of housing as a supporting use to a facility such as a hospital, college or university, research and development campus that would directly benefit from having employees and students living on-site.

Note: Click to view a printer-friendly PDF of Table 16.13-1

TABLE 16.13-1
ALLOWABLE USES AND PERMIT REQUIREMENTS FOR THE INNOVATION ZONING DISTRICT

Symbol	Applicable Process	See Chapter
P	Permitted Land Use - Compliance with development standards and zoning clearance required	16.74
C	Conditional Use - Conditional use permit required	16.52
MC	Minor Conditional Use - Conditional use permit required	16.52
"Blank"	Land use not allowed	

Land Use(1) (2) (3) (4) (5) (6)	INN	See Standards in Section
Communication Facilities		
Broadcast Studio/Recording Studio	C	
Satellite Dishes/Antennas	C	16.44.170A
Wireless Communication Facilities	C	16.44.170B
Education, Public Assembly and Recreation		
Adult Entertainment Businesses		See Definition
Churches/Places of Worship	C	See Definition
Health and Fitness Clubs	P	See Definition
Libraries and Museums		
Recreational Facilities, Private	P	
Schools, College and University	C	
Schools, K - 12		
Studios, Professional	P	See Definition
Manufacturing and Processing		
Bio Medical Manufacturing	P	
Chemical Products Manufacturing	P	See Definition
Clothing Products	P	See Definition
Design/Innovation Technology	P	
Electrical and Electronic Equipment Manufacturing	P	See Definition
Food Products/Food and Beverage Manufacturing	P	See Definition
Furniture and Fixture Manufacturing, Cabinet Shops	P	See Definition
Glass Products	P	See Definition

Green Technologies	P	See Definition
Handicraft Industries and Small Scale Manufacturing	P	See Definition
Information Technologies	P	
Laboratories	P	
Pharmaceutical Manufacturing	P	
Printing and Publishing	P	See Definition
Medical, Office, and Research and Development Uses		
Business Support Services	P	See Definition
Medical Services - Office, Clinics and Laboratories	P	See Definition
Medical Services - Hospital	C	See Definition
Offices	P	16.44.110
Research and Development	P	See Definition
Skilled Nursing - Short Term	C	See Definition
Support Services		
Assisted Living/Skilled Nursing	C	See Definition
Theaters, Auditoriums and Meeting Halls	p(7)	See Definition
Automatic Teller Machines (ATMs)	P	
Banks and Financial Services	P	See Definition
Bars and Alcoholic Beverage Drinking Places	MC(7)	16.44.030
Convenience Stores	p(7)	16.44.030
Day Care Centers/Child Day-Care Facilities	MC(7)	16.44.050
Design/Innovation Technology Firms	P	
Eating and Drinking Establishments Services	p(7)	16.44.030
Eating and Drinking Establishments Services, with Drive-Through Facilities		16.44.030
Hotels	P	16.44.090
Employee Workforce and Student Units	p(7)(8)	16.44.150
Laundry and Dry Cleaning, Drop-off Only	P	
Marijuana Cultivation, Delivery, Dispensary, and Processing		
Medical Marijuana Dispensary		See Definition
Medical Marijuana Dispensary, Mobile		See Definition
Personal Services	p(7)	See Definition
Public Safety and Utility Facilities	P	See Definition
Retail Stores/General Merchandise	p(7)	See Definition
Schools, Specialized Education and Training	P	See Definition
Service Station		See Definition
Transportation		

Alternative Fuels and Recharging	p(9)	
Heliport/Helipad associated with a Hospital/Hotel	C	
Parking Lot/Structure	C	See Definition
Transit Stations and Terminals	C	See Definition
Vehicle Storage Facilities		See Definition

(1) See Section 16.04.020 regarding uses not listed.

(2) See Chapter 16.110 for definitions of land uses listed.

(3) A development permit may also be required (Chapter 16.56 Development Plan Permits).

(4) Permanent and/or temporary outdoor storage of materials in conjunction with an on-site primary use requires approval of a conditional use permit (Chapter 16.52 Conditional Use Permits).

(5) Storage of hazardous materials in excess of threshold established by the Uniform Building Code requires approval of a minor conditional use permit (Chapter 16.62 Conditional Use Permits) and compliance with Section 16.18.070 Hazardous Materials Storage.

(6) Conversion or reuse of an existing residential structure may be allowed with approval of a conditional use permit (Section 16.32.030 B.3).

(7) Use shall be integrated as an accessory use of a primary specialty school, college, university, hospital, hotel, office and/or research use and such use shall be incorporated within the primary use's structure. Use shall not be located in a stand-alone building. Employee Workforce and Student Units may be located in a stand-alone building within a master planned project that encompasses more than 1,000,000 SF of non-residential uses.

(8) Students and/or employees should have an association or affiliation with the primary use located on-site.

(9) Not petroleum-based.

16.13.020 Innovation District General Development Standards.

New land uses, structures, and alterations to existing uses or structures shall be designed, constructed, and/or established in compliance with the building setback, height, on-site landscaping requirements in Table 16.13-2, Innovation District General Development Standards, site and building Design Standards in Section 16.13.030, and applicable development standards (e.g. landscaping, parking, and loading, etc.) in Article III, Site Planning and General Development Standards.

Note: Click to view a printer-friendly PDF of Table 16.13-2

TABLE 16.13-2
INNOVATION DISTRICT GENERAL DEVELOPMENT STANDARDS(1) (2)

Development Feature	Standard
Required Building Setbacks	
Front	10 feet minimum
Rear	10 feet minimum
Street Side(3)	10 feet minimum

TABLE 16.13-2
INNOVATION DISTRICT GENERAL DEVELOPMENT STANDARDS(1) (2)

Development Feature	Standard
Interior Side(3)	10 feet minimum
From Freeway	100 feet minimum
From Residential Districts	75 feet minimum when adjacent to a residential district
Maximum Building Height(4)	150 feet
Minimum Ceiling Heights	14 feet – ground floor
	10 feet – above ground floor
Minimum Lot Size	10,000 square feet for 1 and 2 stories, 20,000 square feet for 3 and 4 stories, and 40,000 square feet for 5 or more stories
Required Building Massing Stepbacks	
Floors 3 and Higher	Minimum 10 additional feet from face of second floor below
Accessory Structures	Same as main structure
Public Art Standards	
Minimum Public Art	One percent (1%) of construction costs (capped at $400,000) to public art for projects where a building permit value exceeds $5,000,000.
Eligible Artworks	Public art located at or near the site; no commercial messages, including designs and logos
Landscaping/Open Space Standards	
Minimum On-site Landscaping/Open Space(5)	20 Percent of the project's lot area. Amenities such as court yards, roof top gardens, outdoor dining, food trucks/vendors spaces, shade structures, plazas, and artwork on-site may count towards landscaping/open space requirements.
Minimum Surface Parking Area Landscaping Standards(6)	
5 - 24 spaces	5 percent of the parking area
25 - 49 spaces	7.5 percent of the parking area
50 spaces plus	10 percent of the parking area
Parking Requirements	
See Chapter 16.34, Off-Street Parking and Loading Standards	

(1) Portions of a site may be developed prior to development of the entire site, if it can be demonstrated that the portion does not compromise the overall comprehensive development of the site.

(2) Development standards may vary for projects over ten acres in size when comprehensively planned in compliance with Chapter 16.64, Master Development Plans, or Chapter 16.66, Specific Plans.

(3) Measured from right of way line or property line.

(4) For structures greater than fifty (50) feet in building height and within 500 feet of existing residential districts, a public hearing shall be required, and the review shall include an evaluation of view

TABLE 16.13-2 INNOVATION DISTRICT GENERAL DEVELOPMENT STANDARDS(1) (2)	
Development Feature	**Standard**
sheds to maintain views for residential homes in the residential district and a shadow survey to avoid nonresidential buildings casting shadows on residential homes. No building shall exceed any Federal Aviation Administration (FAA) requirements. (5) See Chapter 16.28, Landscaping Standards and Water Efficient Landscaping. (6) Minimum required parking lot landscaping area is included in required minimum on-site landscaping/open space area.	

16.13.030 Innovation District Design Standards.

The following standards are provided to ensure high quality development. In order to meet a certain standard, one or a combination of features shall be incorporated in the project's design. Exhibits A and B, depicted in Section 16.13.040, –help to depict conceptual designs of what is possible within the Innovation District. Exhibit A depicts a single building project. Exhibit B depicts a multiple building project.

A. Site Planning.

1. Site Character.

a. **Standard:** Natural amenities (e.g., views, mature trees, creeks, riparian corridors, and topographic features) unique to the site should be preserved and incorporated into the project's design whenever possible.

b. **Standard:** Structures that are historic or are otherwise distinctive because of their rural appearance, age, cultural significance, or unique architectural style as determined by the Director shall be preserved and incorporated into project proposals.

c. **Standard:** Structures shall not face their back side or loading areas onto existing or planned amenities (e.g. parks, open space, and water features) and/or streets.

d. **Standard:** Frontage roads or drives shall be provided adjacent to open space areas unless a project is designed to provide direct pedestrian access to the open space and the road or drive is not otherwise necessary.

e. **Standard:** Buildings over 10,000 square feet in size shall include an outdoor employee seating area for use during breaks and/or for lunch.

2. Land Use Buffering.

a. **Standard:** Noise, traffic, or odor-generating activities should be located adjacent to similar activities on adjacent properties whenever possible. Buffering between different land uses shall be in compliance with Section 16.18.120 (Screening and Buffering).

b. Standard: Loading areas, access and circulation driveways, trash enclosures, and mechanical equipment should be located within the project as-far-as practical from any adjacent residences.

c. Standard: When adjoining uses can mutually benefit from connection rather than separation, appropriate connective elements (e.g., walkways, common landscape areas, building orientation, and unfenced property lines) should be provided between the uses.

d. Standard: Window orientation in nonresidential buildings should preclude a direct line of sight into adjacent residential units and private open spaces located within one-hundred feet of the shared property line. Required, maintained landscaping for screening, such as evergreen trees, may provide a barrier to block the direct line of sight.

e. Standard: When nonresidential buildings back-up to open space areas of residential projects, parks, or open space districts, the rear setback area shall be landscaped (consistent with Section 16.28) with direct line of sight obscuring vegetation to screen parking lots.

3. Building Placement.

a. Standard: Projects containing multiple buildings shall place a minimum 15% building frontage adjacent to the front setback line. The Director may waive or reduce this standard for projects where implementation of this standard is not feasible.

b. Standard: Multiple buildings in a single project shall have a functional relationship with one-another to achieve a "village" scale by use of at least two of the following features:

1) Cluster buildings around open plaza areas, not parking lots.

2) Provide courtyards with landscaping and other pedestrian amenities.

3) Provide convenient pedestrian circulation between buildings and between parking areas and buildings using enhanced paving materials.

4) Link buildings together visually using trellis structures, arcades, and enhanced paving.

c. Standard: Buildings should have their entrances oriented towards transit stops for convenient access.

4. Trash/Loading/Storage Areas.

a. Standard: All trash and recyclable enclosures shall match the primary structure's architecture and building materials.

b. Standard: All trash and recyclable bins shall be stored in approved enclosures in compliance with Section 16.18.150 (Solid Waste and Recyclable Materials).

c. Standard: The location of enclosures should allow convenient access for each tenant.

d. Standard: Enclosures should be located as far away from adjacent residential uses as practical.

e. Standard: Loading facilities shall not be located at the front of buildings. These facilities shall be located at the rear of the site or in an area that is adequately screened from view.

f. **Standard:** Loading facilities shall be fully screened from view from all adjacent public streets and freeways.

g. **Standard:** Screening of loading areas shall be accomplished with architectural elements or landscaping, or a combination of both.

5. Utility and Mechanical Equipment.

a. **Standard:** All mechanical equipment (e.g., compressors, air conditioners, heating and ventilating equipment, chillers, stand pipes, etc.) shall be concealed from view in compliance with Section 16.18.120 (B) (Screening and Buffering). Screening devices shall be compatible with the architecture and color of the adjacent buildings.

b. **Standard:** Mechanical equipment shall not be located on the roof of a structure unless the equipment can be screened by building elements that are designed for that purpose and that are an integral part of the building design.

c. **Standard:** Utility equipment (e.g., electric and gas meters, electrical panels, and junction boxes) shall be located in utility rooms within the structure or utility cabinets with exterior access.

B. Parking and Circulation.

1. General.

a. **Standard:** Parking spaces on public streets within 100 feet of the property allow for a 1:1 ratio parking reduction to required on-site parking.

b. **Standard:** Design should be creative and utilize features such as wrapping buildings around parking lots, subterranean parking/podium parking, shared vehicle parking, EV charging, bicycle infrastructure, and seating.

c. **Standard:** Projects over 10,000 square feet in floor area shall incorporate at least two of the following features:

1) Shared vehicle parking
2) EV charging
3) Bicycle infrastructure
4) Dedicated raised pedestrian access from parking areas to the project entrance

d. **Standard:** Parking lots shall be separated from buildings by a raised walkway, landscape strip, or combination of such a minimum five (5) feet in width, with a minimum three (3) foot wide walkway. Mow strips are not required in this situation. Parking aisles and/or parking spaces shall not directly abut a building.

e. **Standard:** A multiple building project may have multiple ownerships, but shall be integrated with a common circulation system.

2. Project Entry.

a. **Standard:** Parking lots with over one hundred (100) parking stalls shall provide a main entry drive from a public street for a minimum distance of forty (40) feet and shall include a minimum four (4) foot-wide sidewalk from the street to the first cross aisle on at least one side, and at least one of the following features:

1) A minimum seven foot wide landscaped enter median from the public street to the first cross aisle.

2) Two seven (7) foot-wide landscaped parkways flanking the main entry drive. The parkway that abuts the sidewalk may be reduced in width to four (4) feet.

b. Standard: The first aisle juncture that intersects the main entry drive shall be placed at least forty (40) feet back from the public street right-of-way to provide adequate queuing distance off the street. Final locations shall be subject to review and approval by the City Engineer.

c. Standard: Entry drives shall be located a minimum of two hundred (200) feet apart and at least one hundred (100) feet from any street intersection property line to driveway centerline. Also, access drives shall be located a minimum of twenty (20) feet from side property lines unless a shared drive is provided.

3. Site Access.

a. Standard: Projects with more than one hundred (100) parking stalls that are located on an arterial or larger road shall coordinate access points with median openings and existing driveways on the opposite side of the roadway. Final locations shall be subject to review and approval by the City Engineer.

b. Standard: Projects with more than two-hundred (200) parking stalls that are located on an arterial or a larger street shall provide deceleration lanes adjacent to their major entry per city standards.

c. Standard: Whenever possible, access drives should be located on side streets to maintain efficient traffic flow on major roadways.

d. Standard: All driveway radii shall be per city standards.

4. Pedestrian Access.

a. Standard: Drop-off points (i.e., wider aisles, frontal loading/unloading) shall be located near major building entries and plaza areas for projects over fifty-thousand (50,000) square feet of floor area.

b. Standard: Parking areas shall be designed so that pedestrians walk parallel to moving cars in parking aisles. Minimize the need for pedestrians to cross parking aisles and landscape islands to reach building entries by providing walkways.

c. Standard: Clearly defined pedestrian access shall be provided from transit/bus stops to primary building entrances. In projects with more than one-hundred (100) parking stalls, pedestrian walkways shall be provided through the parking areas from transit/bus-stops.

d. Standard: All projects shall provide a connection of the on-site pedestrian circulation system to the off-site public sidewalk.

e. Standard: Meandering sidewalks shall be provided in the Innovation zoning district when required by the Director.

f. Standard: Parking lots with over one-hundred (100) stalls shall provide a separate pedestrian walkway from the public sidewalk to the on-site walkways. At a minimum, this main entry sidewalk shall provide the following:

1) Be located on one side of the main entry drive aisle.

2) Be a minimum of four feet (4) wide.

3) Be raised and protected from the drive aisle by a six (6) inch high curb.

4) Be constructed of concrete or an interlocking paving system. Asphalt sidewalks are not allowed.

g. Standard: Emphasis at pedestrian crossings of driveways and major circulation aisles shall be accentuated at building entries by extending the sidewalk to the back edge of the parking spaces.

5. Bus Turnouts.

a. Standard: Bus turnouts may be required wherever the potential for auto/bus conflicts warrants separation of transit and passenger vehicles. Bus turnouts shall be considered by the City Engineer when at least two of the following conditions apply:

1) Bus parking in the curb lane is prohibited;

2) Traffic in the curb lane exceeds two-hundred and fifty (250) vehicles during peak hour;

3) Passenger volumes exceed twenty persons boarding an hour;

4) Traffic speed is greater than forty-five (45) miles per hour; and

5) Accident patterns are recurrent.

b. Standard: Bus turnouts shall be designed in compliance with city standards.

C. Architectural Design.

1. Architectural Style.

a. Standard: No specific architectural style or design theme is required. A variety of architectural characteristics may be considered to add to the city's overall image. However, while variety in design is generally encouraged, compatibility of new projects with their architectural style and surroundings should be a priority.

2. Design Consistency.

a. Standard: Designs shall demonstrate a consistent use of colors, materials, and detailing through-out all elevations of a building and throughout all buildings of a multiple building project.

b. Standard: Elevations that do not directly face a street shall not be ignored or receive only minimal architectural treatment. Building articulation is required on all sides of the building.

c. Standard: Each facade shall be designed for public view and shall be appropriately landscaped in compliance with the landscaping standards in Chapter 16.28 (Landscape Standards).

3. Form and Mass.

a. Standard: Designs shall provide a sense of human scale and proportion. Structures shall be designed to avoid a "box-like" appearance and adhere to the required building step backs discussed in Table 16.13-2 Innovation District General

Development Standards. In addition, structures should incorporate the following design features:

1) Provide horizontal and vertical wall articulation through the use of arcades, towers, and wall recesses and projections.

2) Provide architectural detail through the use of columns, three-dimensional decorative cornice bands, recessed entries and windows, and awnings and canopies.

3) Use different, but compatible, building materials with varying textures and colors.

b. Standard: Entries shall have areas that are protected from the elements and shall create a focus and sense of entry for the building by use of at least two of the following design features:

1) An entry courtyard with landscaping and a feature, such as a fountain or sculpture

2) Provide wall recesses.

3) Use roof overhangs.

4) Incorporate canopies and awnings.

5) Include arcades with a small courtyard or feature.

6) Install pedestrian oriented signs.

4. Roofs.

a. Standard: Variations in roof lines shall be used to add interest to, and reduce the massive scale of large commercial buildings. Roofs shall incorporate at least two of the following features:

1) Parapets concealing flat roofs and rooftop equipment. The average height of a parapet shall not exceed fifteen (15) percent of the height of the supporting wall and parapets shall not at any point exceed one-third the height of the supporting wall. Parapets shall incorporate a three-dimensional cornice.

2) Overhanging eaves, extending at least three feet past the supporting walls.

3) Sloping roofs that do not exceed the average height of the supporting walls with an average slope greater than or equal to one-foot for vertical rise for every three feet of horizontal run and less than or equal to one-foot of vertical rise for every one-foot of horizontal run.

4) Three or more roof slope planes.

b. Standard: Parapet walls shall be treated as an integral part of the structure design.

c. Standard: Parapet walls should receive architectural detailing consistent with the rest of the facade design and should not appear as unrelated elements intended only to screen the roof behind.

d. Standard: Where a mansard roof is incorporated into the parapet design, views from above the structure should also be considered relative to any visible structural support elements.

5. Building Materials.

a. **Standard:** False or decorated facade treatments, wherein one or more unrelated materials appear to be "stuck on" a building, should be avoided.

b. **Standard:** Artificial materials that attempt to imitate real materials (e.g., wood, stone, brick, etc.) are not allowed.

c. **Standard:** The composition of materials should avoid giving the impression of thinness and artificiality.

d. **Standard:** Veneers should turn corners, avoiding exposed edges.

e. **Standard:** Stock, pre-fabricated, "off-the-shelf" metal buildings are prohibited as primary structures.

6. Colors.

a. **Standard:** Facade colors shall be low reflective, subtle, neutral or earth tone colors. The use of high-intensity colors, metallic colors, black, or fluorescent colors is prohibited.

b. **Standard:** Building trim and accent areas may feature brighter colors, including primary colors, but neon tubing shall not be an acceptable feature for building trim or accent area.

c. **Standard:** The transition between base and accent colors shall relate to changes in building materials or the change of building surface planes. Colors should not meet or change without some physical change or definition to the surface plane.

7. Additions to Existing Structures.

a. **Standard:** The design of an addition to an existing structure shall follow the general scale, proportion, massing, and detailing of the original structure. The addition shall be integrated and harmonious with the original structure, not a stark contrast.

b. **Standard:** Additions shall be an interpretation of the existing building wherein the main characteristics of the existing structure are incorporated into the design of the addition by use of at least two of the following design features:

1) Repeat window and door spacing;

2) Use harmonizing colors and materials; and/or

3) Include similar, yet distinct, architectural details (e.g., window/door trim, lighting fixtures, tile/brick decoration, etc.).

D. Employee Workforce and Student Units.

1. General.

a. **Standard:** The use of the units by employees or students shall be associated or affiliated with the primary use of the site.

b. **Standard:** Each unit shall provide 300 to 600 square feet of habitable space with a maximum of two occupants per unit.

c. **Standard:** At a minimum, each unit must contain full sanitary facilities including a sink, toilet, shower and/or bath facilities.

d. **Standard:** Shared amenities shall be at least 20 percent of the gross floor area and include food preparation/dining facilities, entertainment and work spaces.

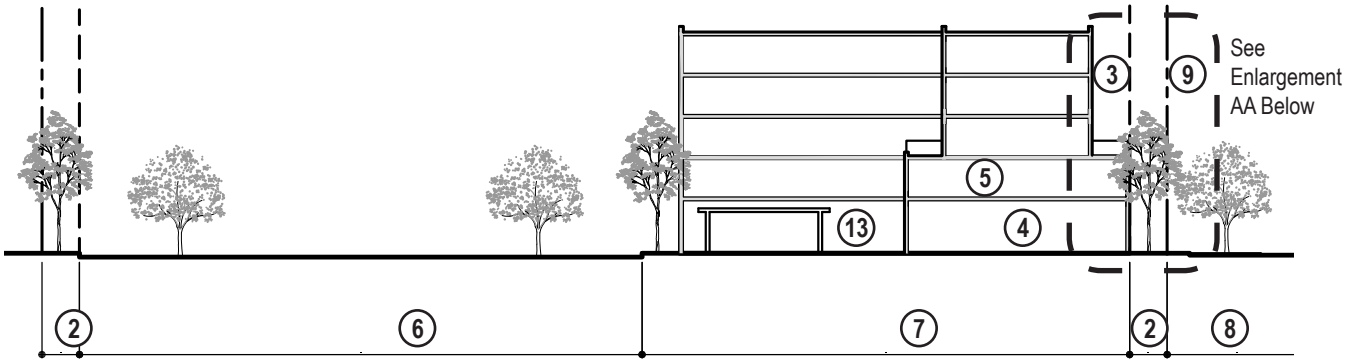
e. **Standard:** Units are intended for rent only.

16.13.040 Innovation District Design Standard Exhibits.

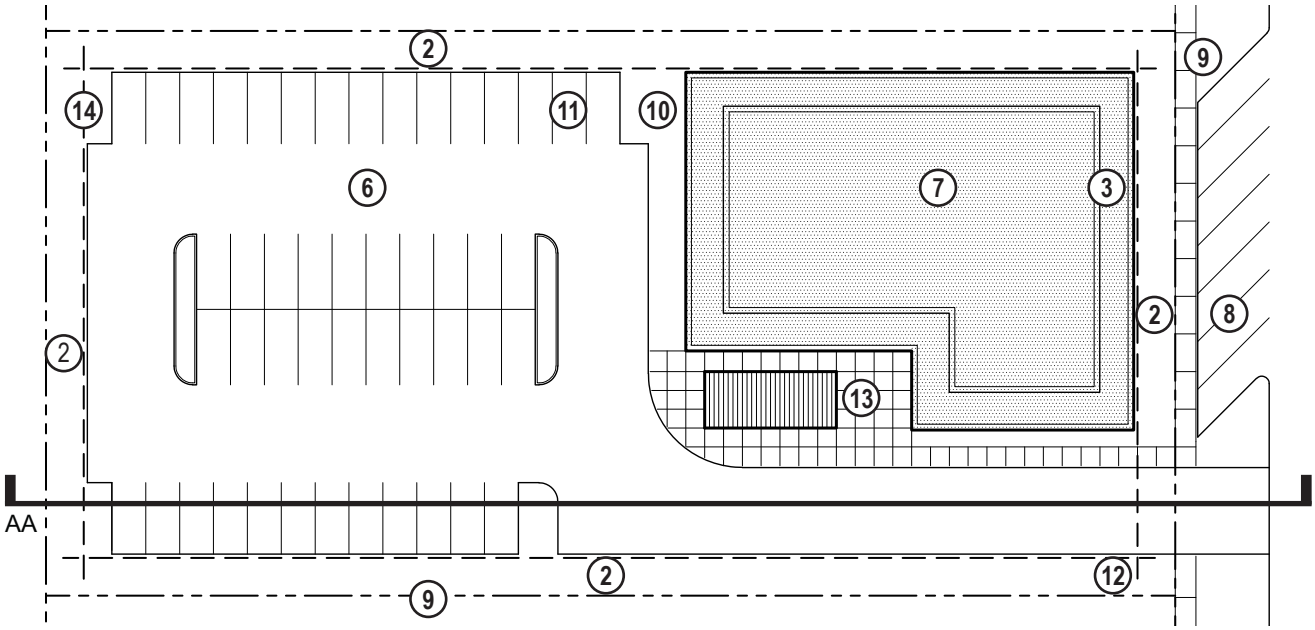
Exhibits A and B, depicted in Section 16.13.040, help to depict conceptual designs of what is possible within the Innovation District. Exhibit A depicts a single building project. Exhibit B depicts a multiple building project.

INNOVATION DISTRICT DESIGN STANDARDS CONCEPT - EXHIBIT A

SINGLE BUILDING PROJECT



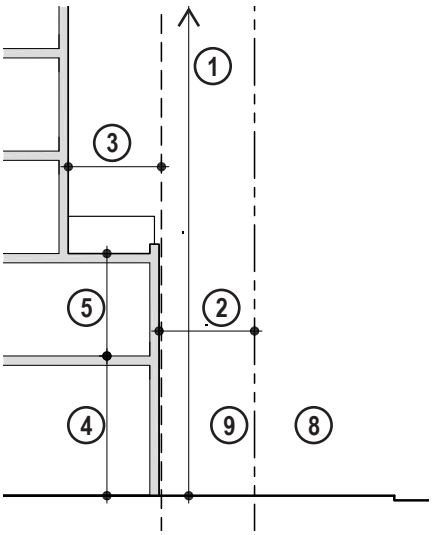
SECTION/ELEVATION - AA



PLAN VIEW

LEGEND

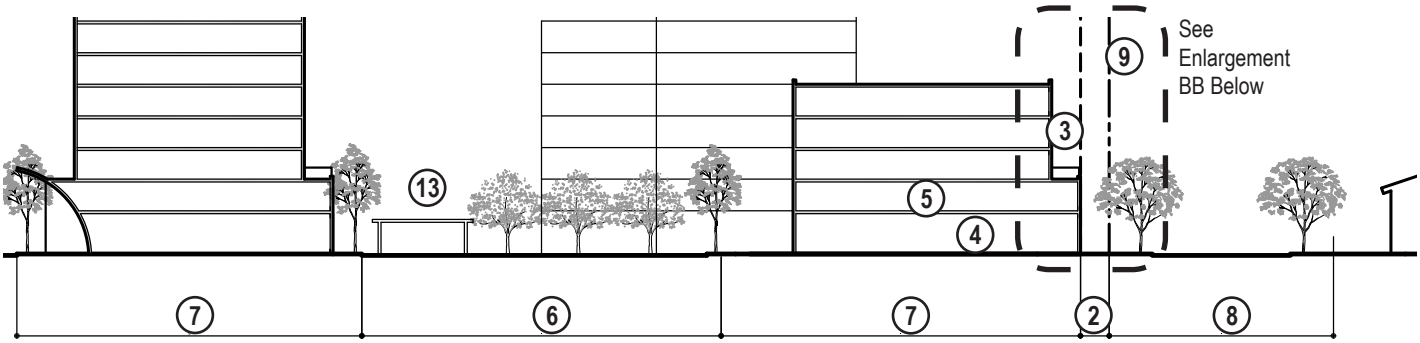
1. Number of Stories
   150' maximum height
2. Building Setback & Landscape (for floors one and two)
   - 10' minimum from all property lines
   - 75' minimum from any adjacent residential district
   - 100' minimum from freeway right-of-way
3. Building Massing Stepbacks
   - 10' minimum stepback from 2nd floor face
4. Ground Floor Height
   - 14' minimum
5. Above Ground Floor Height
   - 10' minimum
6. Parking Lot
7. Building
8. Street Right-of-Way
9. Property Line
10. Loading Area
11. EV/Bike/Shared Parking
12. Entry Monumentation/ Art Location
13. Courtyard/Gathering Area
14. Trash Enclosure



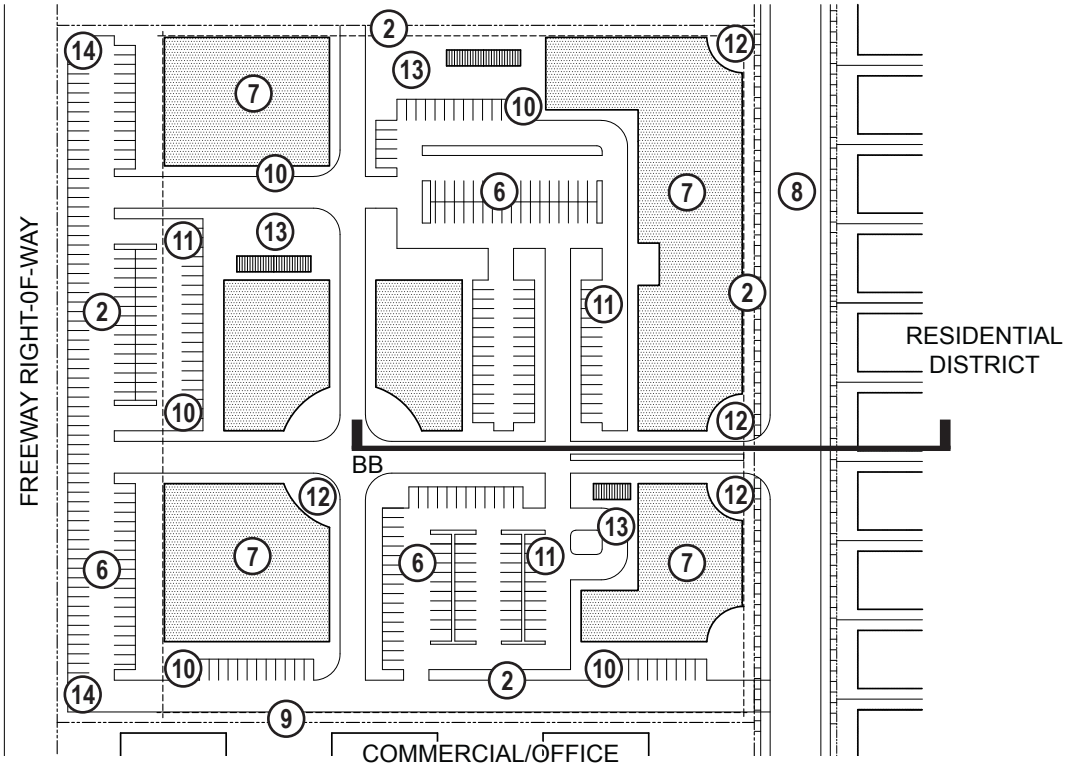
ENLARGEMENT-AA

INNOVATION DISTRICT DESIGN STANDARDS CONCEPT- EXHIBIT B

MULTIPLE BUILDINGS PROJECT



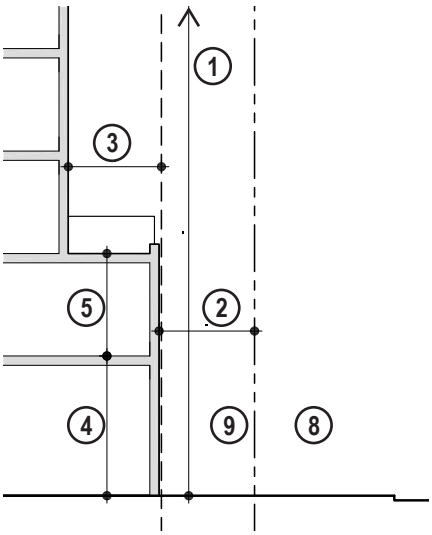
SECTION/ELEVATION - BB



PLAN VIEW

LEGEND

1. Number of Stories
   150' maximum height
2. Building Setback & Landscape (for floors one and two)
   - 10' minimum from all property lines
   - 75' minimum from any adjacent residential district
   - 100' minimum from freeway right-of-way
3. Building Massing Stepbacks
   - 10' minimum stepback from 2nd floor face
4. Ground Floor Height
   - 14' minimum
5. Above Ground Floor Height
   - 10' minimum
6. Parking Lot
7. Building
8. Street Right-of-Way
9. Property Line
10. Loading Area
11. EV/Bike/Shared Parking
12. Entry Monumentation/ Art Location
13. Courtyard/Gathering Area
14. Trash Enclosure



ENLARGEMENT-BB

Table 16.28-1 MINIMUM LANDSCAPED AREA BY ZONING DISTRICT	
Zoning District	**Minimum % of Site Area Required to be Landscaped**
Multi-Family 1, Residential (MF-1) Multi-Family 2, Residential (MF-2) Multi-Family 3, Residential (MF-3)	Ten (10) percent
Neighborhood Commercial (NC) Business Park (BP)	Fifteen (15) percent
Office (O) Office Research Park (ORP) Innovation (INN) Community Commercial (CC) Regional Commercial (RC)	Twenty (20) percent
Rural Residential (RR) Estate Residential ER-1) Estate Residential (ER-2) Estate Residential (ER-3) Single-Family 1, Residential (SR-1) Single-Family 2, Residential (SR-2)	Twenty-five (25) percent of front yard area
General Industrial (GI) General Industrial - A (GI-A)	Five (5) percent

C. New Single-family Residences. New single-family developments and custom homes shall provide landscaping with an automatic irrigation system for the area of the site between the street curb and the front of the structure from side property line to side property line. The landscape design should include a combination of trees, shrubs, groundcover, mulch, and hardscape, and shall emphasize water-conserving plant materials and irrigation to the greatest extent feasible.

1. Front yard landscaping shall be provided in all residential zoning districts. The minimum landscaped area should be located within the front yard setback, whenever possible, as identified in Table 3-4.

2. A minimum of one (1) street tree (24 inch-box) forty (40) feet on center (two (2) feet on private side of property) and two (2) shade trees (15-gallon) on the property shall be provided. Corner lots shall provide a minimum of three shade trees (15-gallon minimum).

4. Has not met, or has violated any condition of approval:
5. It is in violation of any code, law, ordinance, or statute;
6. Is detrimental to public health, safety, or welfare; or
7. Constitutes a nuisance.

G. **Enforcement.**

1. Any person who cuts, damages, or moves a protected tree in violation of this chapter shall be deemed guilty of a misdemeanor and upon conviction may be punished in compliance with the applicable provisions of the municipal code.

2. Violation of this chapter during construction activity may result in an immediate stop-work order until permits are obtained along with proper mitigation procedures. (Ord. 182 § 2 (part),1997)

16.44 Standards for Specific Land Use

Sections:

16.44.010 Purpose and Applicability.
16.44.020 Adult Entertainment/Sexually Oriented Business Establishments.
16.44.030 Alcoholic Beverage Sales.
16.44.040 Animal Keeping.
16.44.050 Child Day-Care Facilities.
16.44.060 Condominium Standards.
16.44.070 Reserved.
16.44.080 Drive-ln and Drive-Through Facilities.
16.44.085 Gated Communities.
16.44.090 Hotels and Motels.
16.44.100 Mixed Use Projects.
16.44.110 Office Buildings.
16.44.120 Outdoor Display and Sales Standards.
16.44.130 Outdoor Storage.
16.44.140 Recycling Facilities.
16.44.150 Residential Accessory Uses and Structures.
16.44.160 Accessory Dwelling Units.
16.44.161 Employee Workforce and Student Units
16.44.170 Telecommunications Facilities.
16.44.180 Vehicle Dealerships.
16.44.190 Vehicle Repair and Service.
16.44.200 Emergency Residential Shelters and Transitional Housing.
16.44.210 Bingo.
16.44.220 Non-commercial Wind Energy Conversion Systems.
16.44.230 Residential Wedding/Event Facilities in RR and ER Districts.
16.44.240 Indoor Firing Ranges.
16.44.250 Medical Marijuana Land Use Prohibition

a. No setback shall be required for an existing garage that is converted to an accessory dwelling unit.

b. If an accessory dwelling unit is constructed above a garage, the required side and rear setbacks shall be a minimum of five feet from the side and rear lot lines.

H. Accessory Dwelling Units within an Existing Space. An accessory dwelling unit contained within an existing residence or accessory structure with independent exterior access from the existing residence and with side and rear setbacks meeting fire safety shall be allowed in single family residential zones with no additional development standards or additional parking provided that the main dwelling is in compliance with Chapter 16.34 (Off-Street Parking and Loading Standards). These are subject to size restrictions and are based on whether or not the accessory dwelling unit is attached or detached.

I. Parking. The accessory dwelling unit shall be provided one covered off-street parking space, in addition to that required for the main dwelling unit, in compliance with Chapter 16.34 (Off-Street Parking and Loading Standards). No off-street parking is required for the accessory dwelling unit if it meets any of the following:

1. Is within a half mile from public transit.
2. Is within an architecturally and historically significant historic district.
3. Is in an area where on-street parking permits are required, but not offered to the occupant of the accessory dwelling unit.
4. Is located within one block of a car share area.

(Ord. 537, Exhibit A (part), 2018; Ord. 482-13 § 2, 2013; Ord. 293 § 1 (part), 2004; Ord. 227 § 2 (part), 2000; Ord. 182 § 2 (part), 1997)

16.44.161 Employee Workforce and Student Units.

Employee Workforce and Student Units shall be developed in accordance with section 16.13 (Innovation Districts).

16.44.170 Telecommunications Facilities.

This section establishes standards for the development and operation of telecommunications facilities including satellite dishes and wireless communications facilities. Satellite dishes are a permitted use in residential, commercial, and industrial zoning districts in compliance with Article II (Zoning Districts and Allowable Land Uses) subject to regulations in Section 16.44.170A. Wireless communications facilities may not be permitted with a conditional use permit subject to the regulations in Section 16.44.170B.

A. Satellite Dishes. Satellite dishes, including portable units, shall be designed, installed and maintained in compliance with the Federal Communications Commission (FCC) and the California Public Utilities Commission (CPUC) regulations and in compliance with this section. Satellite dishes with a maximum diameter of one meter are not regulated by this chapter.

1. Plans. Plans for satellite dishes shall be submitted with each application for a building permit, and shall include a site plan and elevation drawings indicating the color, diameter, foundation details, height, landscaping, setbacks and method(s) of screening.

2. Painting. The dishes and any supporting structure shall be painted a single, neutral, nonglossy color (e.g., earth-tones, gray, black, etc.).

living room of not less than 220 square feet of floor area. An additional 100 square feet of floor area shall be provided for each occupant of such unit in excess of two. The unit shall be provided with a separate closet. The unit shall be provided with a kitchen sink, cooking appliance and refrigeration facilities, each having a clear working space of not less than 30 inches in front. Light and ventilation conforming to this code shall be provided. The unit shall be provided with a separate bathroom containing a water closet, lavatory and bathtub or shower.

Electronics and Equipment Manufacturing (Land Use). Establishments engaged in manufacturing machinery, apparatus, and supplies for the generation, storage, transmission, transformation and use of electrical energy, including:

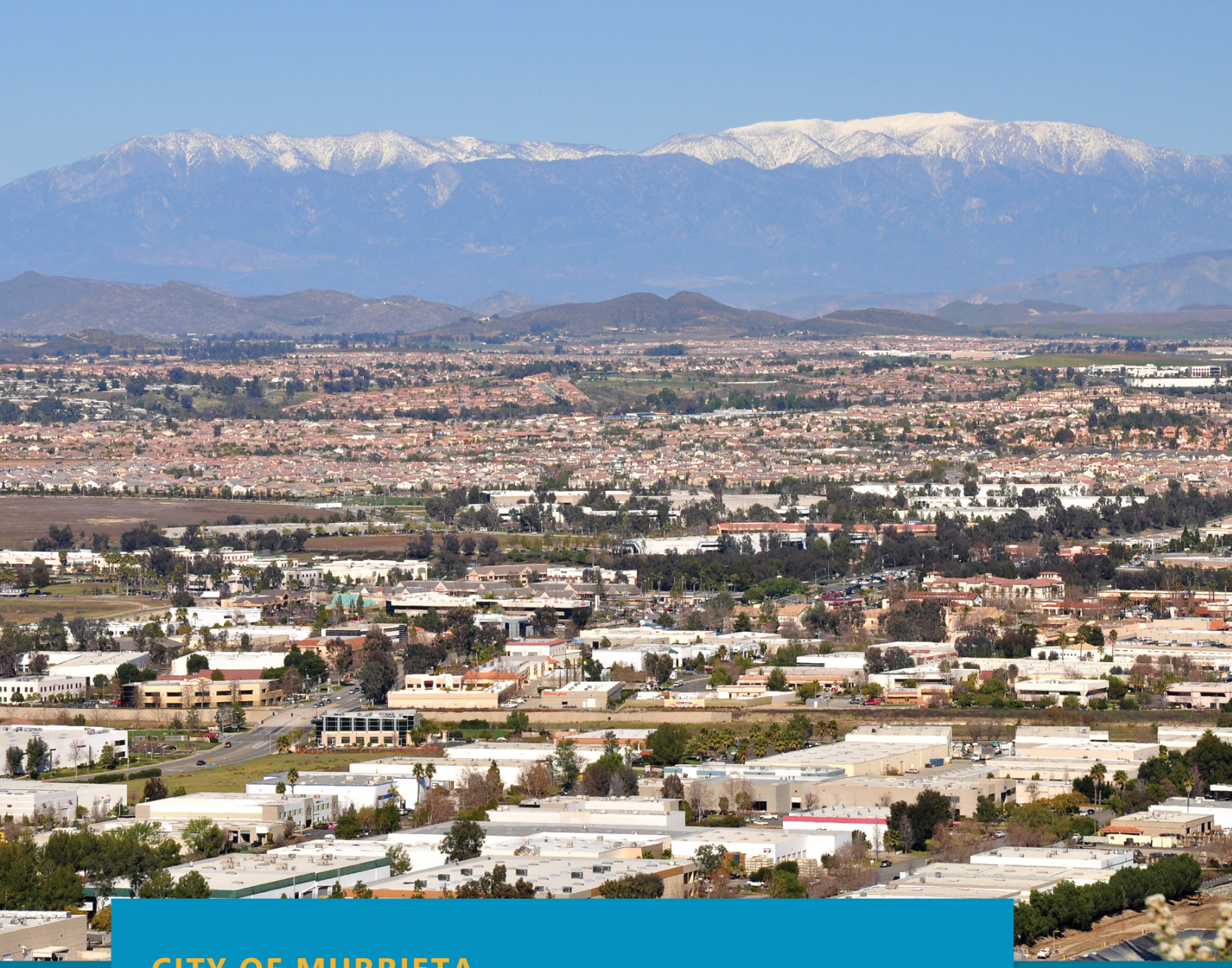
1. Appliances such as stoves/ovens, refrigerators, freezers, laundry equipment, fans, vacuum cleaners, sewing machines;
2. Aviation instruments;
3. Electrical transmission and distribution equipment;
4. Electronic components and accessories, and semiconductors, integrated circuits, related devices;
5. Electronic instruments, components and equipment such as calculators and computers;
6. Electrical welding-apparatus;
7. Lighting and wiring equipment such as lamps and fixtures, wiring devices, vehicle lighting;
8. Industrial apparatus;
9. Industrial controls;
10. Instruments for measurement, testing, analysis and control, associated sensors and accessories;
11. Miscellaneous electrical machinery, equipment and supplies such as batteries, X-ray apparatus and tubes, electromedical and electrotherapeutic apparatus, electrical equipment for internal combustion engines;
12. Motors and generators;
13. Optical instruments and lenses;
14. Photographic equipment and supplies;
15. Pre-recorded magnetic tape;
16. Radio and television receiving equipment such as television and radio sets, phonograph records and surgical, medical and dental instruments, equipment, and supplies;
17. Surveying and drafting instruments;
18. Telephone and telegraph apparatus;
19. Transformers, switch gear and switchboards; and
20. Watches and clocks.

Does not include testing laboratories (soils, materials testing, etc.) (see "business support services"), or re-search and development facilities separate from manufacturing (see "research and development").

Emergency Shelters. Facilities for the temporary shelter and feeding of indigents or disaster victims, operated by a public or non-profit agency.

Employee Workforce and Student Units. Housing units that are associated with and supporting to facilities such as a hospitals, colleges or universities, or research and development campuses that would directly benefit from having employees and students living onsite.

APPENDIX J
Draft Climate Action Plan



CITY OF MURRIETA

Climate Action Plan Update

JANUARY 2020

PREPARED BY:

The City of Murrieta

IN CONSULTATION WITH:

Ascent Environmental, Inc.

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LIST OF ABBREVIATIONS

2011 CAP	2011 Climate Action Plan
2017 Scoping Plan	2017 Climate Change Scoping Plan
AB	Assembly Bill
ABAU	Legislative-Adjusted BAU
BAU	business-as-usual
CAP	Climate Action Plan
CAP Update	Climate Action Plan Update
CARB	California Air Resources Board
CCA	Community Choice Aggregation
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CFC	chlorofluorocarbon
CH_4	methane
Checklist	CAP Consistency Review Checklist
City	City of Murrieta
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
EV	electric vehicle
GHG	greenhouse gas
GPU	General Plan Update
GWP	global warming potential
HFC	hydrofluorocarbon
$MMTCO_2e$	million $MTCO_2e$
MPO	metropolitan planning organization
$MTCO_2e$	metric tons of carbon dioxide equivalent
N_2O	nitrous oxide
O_3	ozone
OPR	California Governor's Office of Planning and Research
PFC	perflurocarbon
RHNA	Regional Housing Needs Assessment
RTP	regional transportation plan

SB	Senate Bill
SCAG	Southern California Association of Governments
SCS	sustainable communities strategy
SF_6	sulfur hexafluoride
SLCP	short-lived climate pollutant
Subregional CAP	Subregional Climate Action Plan
VMT	vehicle miles traveled
WCE	Western Community Energy Program
WRCOG	Western Riverside Council of Governments
ZNE	Zero Net Energy

EXECUTIVE SUMMARY

This Climate Action Plan Update (CAP Update) provides a comprehensive roadmap of actions that the City of Murrieta will take to achieve its fair share of greenhouse gas (GHG) reductions consistent with State laws, policy, and goals, and the latest climate change science. Moreover, the GHG reduction measures identified in the CAP Update would also provide important co-benefits to people living and working in the city, including but not limited to cost savings, economic benefits, improved city infrastructure, cleaner air, potential health benefits and reduced traffic congestion. The CAP Update will function as a "qualified plan for the reduction of greenhouse gases" under the State of California Environmental Quality Act (CEQA) Guidelines (Public Resource Code Section 15183.5), thereby affording streamlined environmental review benefits to future development projects.

Scientific evidence shows that the Earth's climate is experiencing a warming trend. The warming, as the result of GHGs in the atmosphere, is known as global climate change. The anticipated impacts of climate change are likely to adversely affect the City's residents and assets, including as a result of increased temperature, extreme heat events and heat waves, urban heat island effect, changes in precipitation patterns, increased wildfire risk, and increased flood risk.

The State government has also taken several steps to reduce GHG emissions and respond to the threat of climate change. In 2006, the California Global Warming Solutions Act (Assembly Bill [AB] 32) established the State's first target to reduce GHG emissions, which created a goal of lowering emissions to 1990 levels by 2020. In 2016, Senate Bill (SB) 32 was signed into law, which codified into statute the mid-term GHG reduction target of 40 percent below 1990 levels by 2030, established by Executive Order (EO) B-30-15. This 2030 target places California on a trajectory towards meeting its longer-term goal, which is to bring emissions down to 80 percent below 1990 levels by 2050. EO B-55-18, signed in September 2018, furthers California's efforts to reduce GHG emissions by setting a goal to achieve carbon neutrality by 2045 and achieve net negative GHG emissions thereafter.

In 2011, the City of Murrieta (City) adopted its first CAP (2011 CAP), as part of the City's General Plan Update (GPU) (2011 General Plan). This CAP Update was prepared concurrently with a focused update of the City's General Plan to be consistent with State legislation and guidance released since the 2011 CAP was adopted. The 2011 CAP's GHG emissions baseline inventory was for the year 2009 and established emission forecasts for 2020 and 2035 with a GHG reduction target year of 2020, to align with State goals at that time. The CAP Update provides an updated baseline year of 2016, emissions forecasts for 2030, 2035, and 2050 with GHG emission targets for 2030 and 2035.

This CAP Update primarily focuses on reducing emissions by 2030 and 2035, and also establishes a 2050 goal, which is important to guide long-term planning. Achieving a 2050 goal in a local government CAP is considerably challenging due to the extended time horizon, uncertainty about the future and the City's limited jurisdiction over numerous sources of emissions. Furthermore, the California Air Resources Board's (CARB) 2017 Climate Change Scoping Plan (2017 Scoping Plan), which lays out the framework for achieving the 2030 target established by SB 32, does not demonstrate a feasible pathway for the State to achieve its 2050 goal at this time. It is technically possible to calculate the scale of emissions reductions at a local level to achieve a 2050 goal, but it is not feasible or meaningful to analyze how a local government can substantially achieve a 2050 target based on local actions alone and therefore, it is difficult to establish defensible reduction assumptions beyond a 15-year time frame. This is primarily because of uncertainty around future technological advances and future changes in State and federal law and a local government's relatively limited jurisdiction over numerous emissions sources and activities that affect emissions.

In the coming decades, new innovations and technologies could become available that will enable further GHG reductions beyond 2035 on the path to achieving the long-term 2050 goal. New or more reliable methods may also become available to quantify measures that are currently unquantifiable. Future laws or regulations may further reduce emissions in sectors currently outside of the jurisdiction of the City (e.g., new vehicle emissions standards that would apply to new or replacement vehicles decades into the future), or emissions in sectors currently addressed primarily by local measures. As climate change science and policy continues to change, the

City will be able to reevaluate how these and other factors are affecting progress toward meeting the long-term 2050 GHG emissions reduction goal in future CAP updates (as outlined in **Chapter 4**).

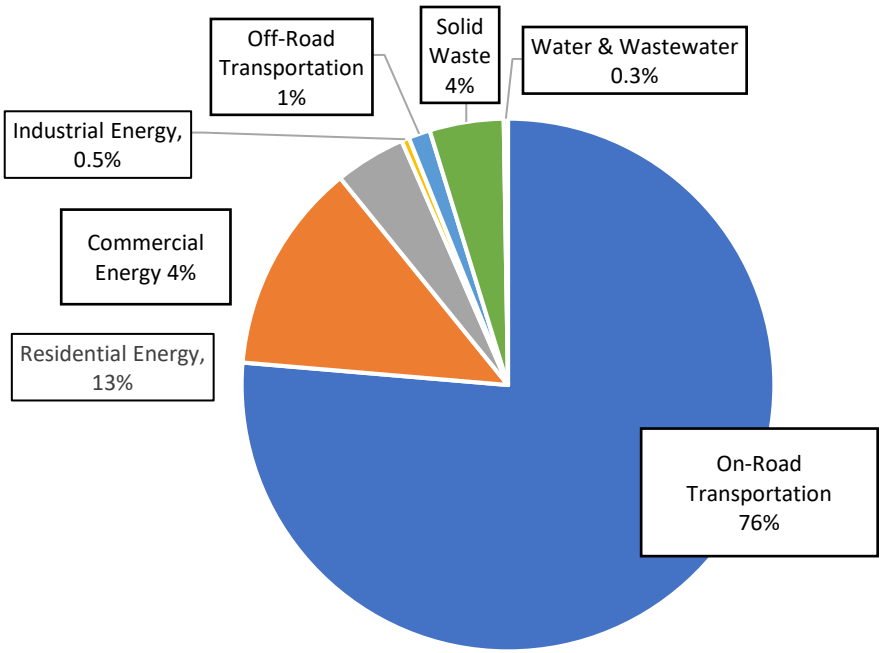
Key Components of the Climate Action Planning Process

Climate action planning is broken up into five key components as identified in **Figure ES-1**. The climate action planning process was used in the development of the implementation of City's CAP Update and is described in detail in the following sections.

Figure ES-1 Climate Action Planning Process

Step 1. Conduct Baseline Assessment

The first step in the CAP Update process was to prepare a GHG emissions inventory assessment for the year 2016 to understand the sources of GHG emissions within the City's jurisdiction as well as provide a baseline for future emissions to be compared to. GHG emissions in this inventory include communitywide emissions resulting from activities occurring and permitted to occur within the existing city limits in 2016. The emissions sectors included in the inventory are on-road and off-road vehicles; residential, commercial, and industrial energy use; solid waste; and water and wastewater. In 2016, community activities in the City accounted for 890,575 metric tons of carbon dioxide equivalent ($MTCO_2e$). On-road vehicles (e.g., vehicular gasoline and diesel consumption) and building energy (e.g., electricity and natural gas consumption in buildings) accounted for about 94 percent (76 and 18 percent, respectively) of the citywide baseline emissions, as shown in **Figure ES-2**. The 2016 baseline was used to set targets for emissions reductions based on State goals. The baseline inventory is described in detail in **Chapter 2**.



Source: Ascent Environmental, Inc. 2019.

Figure ES-2 Greenhouse Gas Emissions Inventory for the City of Murrieta in 2016 by Emissions Category

Step 2. Establish Goals

Emission forecasts were estimated based on the 2016 baseline inventory, current trends in City activity, City demographics, and legislative actions already adopted that could affect future emission sources. This first emissions forecasting scenario is considered as "business-as-usual" (BAU), assuming there would be no changes in citywide activities. Under the BAU scenario, the City would undergo a 75 percent increase in emissions from the 2016 baseline to 2050.

State and federal actions that are planned to continue or start in the future would reduce the City's BAU forecasted emissions. The second scenario that applies legislative actions to forecasted emissions is considered as the legislative-adjusted BAU (ABAU). Under the ABAU scenario, citywide emissions would be below 2016 baseline emissions by 8 percent by 2030 and 2 percent by 2050.

Consistent with CARB's recommendations for community-wide targets, reduction targets were derived for the CAP Update using a mass emissions approach. Because California's statewide emissions in 2016 were below its 1990 baseline levels, no further reduction from 2016 emissions levels are necessary to reach the State's 2020 target. To be consistent with the GPU 2035 buildout year, a target was established based on interpolation of the 2030 and 2050 targets. These targets, to be achieved through implementation of the CAP Update, are to reduce citywide GHG emissions by 40 percent below 2016 levels by 2030, 50 percent below 2016 levels by 2035, and by 80 percent below 2016 levels by 2050. **Table ES-1** provides the City GHG emission forecasts and targets, which are further discussed in **Chapter 2**.

Table ES-1 GHG Emissions Projections and Targets

Forecast	2016 Baseline Emissions ($MTCO_2e$)	2030		2035		2050	
		Total Emissions ($MTCO_2e$)	Change from 2016 Baseline (%)	Total Emissions ($MTCO_2e$)	Change from 2016 Baseline (%)	Total Emissions ($MTCO_2e$)	Change from 2016 Baseline (%)
BAU	890,575	1,122,275	26	1,213,537	36	1,560,442	75
ABAU	--	815,174	-8	820,787	-8	875,589	-2
Reduction Targets	--	536,836	-40	447,363	-50	178,945	-80

Notes: BAU = Business-as-usual; ABAU = Legislative-Adjusted BAU; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent

Source: Ascent Environmental, Inc. 2019.

Step 3. Develop Plan

In addition to State and federal legislative action to meet the City's 2030 and 2035 reduction targets, and 2050 reduction goal, locally-based reduction measures are needed. To meet these targets, the CAP Update identifies measures to reduce GHG emissions citywide from a variety of emissions sources. In total, the City will implement a menu of 20 measures to achieve emission reductions. The measures were developed based on reductions included in the 2011 CAP, recommendations from the Western Riverside Council of Governments (WRCOG) Subregional CAP, larger reductions needed in high emitting sectors, existing local actions that can be expanded upon, technological innovation, the City's influence on impacting emissions, and the feasibility of implementation. In addition, measures were based on their potential for co-benefits such as cost savings, economic development, a healthy community and improved City infrastructure. Each measure provides direct and measurable emissions reductions through implementation of specific programs, policies, or projects. **Table ES-2** provides a list of all measures in the CAP Update. Detailed descriptions of each sector and corresponding measures, along with their associated potential GHG emissions reductions, are included in **Chapter 3**.

Table ES-2 Summary of GHG Reduction Measures

Measure	Description
Transportation	
T- 1	Electric Vehicle Incentives and Promotion
T- 2	Electric Vehicle Charging Ordinance
T- 3	TOD Affordable Housing Program
T- 4	Murrieta Bike Network
T- 5	Signal Synchronization
T- 6	Traffic Calming Program
T- 7	Transportation Demand Management Program
T- 8	Transit Network
T- 9	GHG Reduction Program
Building Energy	
BE-1	Community Renewable Energy
BE-2	Municipal Renewable Energy
BE-3	Zero Net Energy Standard
BE-4	Energy Efficiency and Electrification Program

Table ES-2 Summary of GHG Reduction Measures

Measure	Description
Land Use	
LU-1	Jobs-Housing Balance Strategy
LU-2	Tree Planting Program
LU-3	Open Space Conservation
Solid Waste	
SW-1	Waste Diversion Program
SW-2	Construction Waste Diversion
Water and Wastewater	
WW-1	Landscaping and Water Conservation Program
WW-2	Rainwater Catchment and Greywater Systems Program

Source: Ascent Environmental, Inc. 2019.

Table ES-3 provides a list of key measures focused in the CAP Update which play an important role in the City meeting its GHG reduction targets. **Chapter 4** provides additional discussion of how the nine key GHG reduction measures could be implemented.

Table ES-3 Key GHG Reduction Measures

Measure	Description
Transportation	
T- 1	Electric Vehicle Incentives and Promotion
T- 2	Electric Vehicle Charging Ordinance
T- 7	Transportation Demand Management Program
T- 9	GHG Reduction Program
Building Energy	
BE-1	Community Renewable Energy
BE-2	Municipal Renewable Energy
BE-3	Zero Net Energy Standard
BE-4	Energy Efficiency and Electrification Program
Land Use	
LU-1	Jobs-Housing Balance Strategy

Source: Ascent Environmental, Inc. 2019.

Table ES-4 shows the GHG reductions attributable to the measures in this CAP Update and how anticipated reductions will help the City close the gap in emissions to meet its 2030 and 2035 targets. It also shows the City's progress in achieving its fair-share of emissions reductions toward the State's 2050 goal. Further details of the potential GHG reductions are provided in **Chapter 3**.

Table ES-4 Effect of Plan Measures and Legislative Reductions on City of Murrieta Emissions and Targets ($MTCO_2e$)

Emissions	2030	2035	2050
BAU Emissions Forecasts	**1,122,275**	**1,213,537**	**1,560,442**
Federal and State Legislative Reductions	307,102	392,750	684,853
ABAU Emissions Forecast (BAU Forecasts – Federal and State Legislative Reductions)	**815,174**	**820,787**	**875,589**
Target Emissions	**536,836**	**447,363**	**178,945**
Reductions from CAP Transportation Measures	154,396	204,673	285,324
Reductions from CAP Energy Measures	86,656	123,143	193,059
Reductions from CAP Land Use Measures	32,769	41,614	52,258
Reductions from CAP Solid Waste Measures	5,582	8,043	11,806
Reductions from CAP Water and Wastewater Measures	61	48	0
Total Reductions from CAP Measures	**279,463**	**377,521**	**542,447**
City of Murrieta Emissions with CAP (ABAU – CAP Reductions)	**535,711**	**443,266**	**333,142**
Percentage of gap achieved through CAP Measures	100%	101%	78%

BAU = business-as-usual; ABAU = legislative-adjusted business-as-usual; CAP = Climate Action Plan; GHG = greenhouse gas emissions; $MTCO_2e$ = metric tons of carbon dioxide equivalent

Source: Ascent Environmental, Inc. 2019

Steps 4 and 5. Implement Measures, and Monitor and Verify Progress

Implementation and monitoring mechanisms are identified in the CAP Update to ensure that all measures are adequately implemented, and reduction targets achieved. These steps complete the cyclical process of climate action planning, as demonstrated above in **Figure ES-1**, and provide the necessary information and feedback used to repeat and improve the process.

An important key to implementation will require new development projects to attain higher levels of energy efficiency and incorporate more sustainable design standards. If a project can show consistency with applicable GHG reduction measures in a CAP, the level of analysis for the project required under CEQA with respect to GHG emissions can be reduced considerably. A project's consistency with the CAP will be determined through the CAP Consistency Review Checklist (Checklist). The Checklist would contain GHG reduction measures applicable to development projects that are required to be implemented on a project-by-project basis to ensure that the specific emission targets identified in the CAP Update are achieved.

Implementation of the CAP Update will require ongoing management, oversight, and collaboration, ensuring that actions translate to on-the-ground results and reductions in GHG emissions. Successful implementation requires investment, long-term commitment, and participation of the community. Monitoring CAP actions and measures is an important part of ensuring the success of the CAP Update in meeting the City's targets. City staff will provide periodic updates to the City Council on CAP implementation and efforts. The City will again update the CAP, as needed, to ensure CAP measures remain implementable and feasible, adjusting measures based on changing conditions or demands, and incorporating new technology not considered in the previous CAPs.

Ongoing partnerships between community residents, businesses, property owners, the City, and other agencies and organizations in the region are essential for successful implementation. On a community-wide level, individuals and businesses can play an important role in reducing GHG emissions by changing habits to consume less energy, produce less waste, and drive less. Details on the City's implementation and monitoring efforts and the importance of continued community engagement is outlined in **Chapter 4**.

1 INTRODUCTION

The City of Murrieta (City) Climate Action Plan Update (CAP Update) sets forth measures to reduce greenhouse gas (GHG) emissions from communitywide and municipal activities and is based on the proposed land use changes of the City's focused General Plan Update (GPU). The CAP Update is intended to meet State GHG targets and establishes locally-based measures that would reduce GHG emissions, while also improving livability and quality of life for people that live and work in the City.

The land use pattern of the GPU is a critical component of the City's strategy to reduce GHG emissions by locating residential units in close proximity to potential job opportunities at the employment areas in the proposed and existing Innovation , Business and Office Research Park designated areas. The land use pattern creates opportunities for trips to be made by walking, bicycling, or short vehicle trips, in addition to providing economic benefits.

The CAP Update has also been prepared to meet the requirements of CEQA Guidelines Section 15183.5(b) regarding plans for the reduction of GHG emissions. Doing so creates the opportunity for the City to streamline the analysis of GHG emissions during the environmental review process for future projects that implement the GPU.

1.1 Background and Overview

In 2009, the City initiated a comprehensive update of the General Plan (2011 General Plan), which was adopted on July 19, 2011, and included a Climate Action Plan (2011 CAP). The 2011 CAP established a baseline year for GHG emissions of 2009 and developed emissions forecasts for 2020 and 2035, and a GHG reduction target for 2020, consistent with Assembly Bill (AB) 32. The 2011 CAP included strategies and measures across seven categories (Community Involvement, Land Use and Community Vision, Transportation and Mobility, Energy Use and Conservation, Water Use and Efficiency, Waste Reduction and Recycling, and Open Space) to achieve the established 2020 GHG reduction target.

The City has decided to prepare the CAP Update because of several important changes that have occurred at the State and regional level since the City's 2011 CAP was prepared. Senate Bill (SB) 32, signed into law in 2016, established a statewide GHG reduction target of 40 percent below 1990 levels by 2030. In November 2017, the California Air Resources Board (CARB) published the 2017 Climate Change Scoping Plan (2017 Scoping Plan), which lays out the framework for achieving the 2030 target established by SB 32. The 2017 Scoping Plan identifies GHG reductions by emissions sector to achieve a statewide emissions level that is 40 percent below 1990 levels by 2030. In addition, the cities of Western Riverside County, through the Western Riverside Council of Governments (WRCOG) have established a common framework to allow for a commonality of regional climate action objectives known as the Subregional Climate Action Plan (Subregional CAP). This CAP Update would make the City's CAP consistent with State GHG reduction targets and relevant guidance contained in the WRCOG Subregional CAP completed in September 2014.

This CAP Update reflects the City's proposed GPU, including the creation of the new Innovation land use designation and a revised mix and location of land use designations in six areas of the City. The CAP Update reflects the proposed GPU's addition of 1,572 dwelling units and reduction of 2,405,601 square feet of non-residential land uses relative to the 2011 General Plan. Making the CAP Update consistent with the GPU and extending the City's GHG reduction target from 2020 to 2035 creates the opportunity for the City to streamline the analysis of GHG emissions during the environmental review process for projects that implement the GPU.

This CAP Update consists of four chapters, which in addition to this Introduction includes the following:

Chapter 2 Greenhouse Gas Emissions Inventory, Forecasts, and Targets: This chapter summarizes the sources of the City's existing and future GHG emissions. It presents an updated baseline inventory of community emissions for 2016, emissions forecasts for future years, and reduction targets for 2030 and 2035 based on State legislation and the GPU horizon year. It also identifies the significant role that State level strategies play in reducing GHG emissions within the City. The technical methods and other details supporting this analysis are provided in **Appendix A**.

Chapter 3 Greenhouse Gas Reduction Measures: To meet its reduction targets, the City will implement local measures to reduce communitywide GHG emissions. This chapter describes the measures the City has identified to reduce GHG emissions and achieve its 2030 and 2035 GHG targets. The analysis showing the numeric contribution of individual GHG reduction measures toward meeting the 2030 and 2035 targets, along with reduction calculation details for each GHG reduction measure, are provided in **Appendix B**.

Chapter 4 Implementation and Monitoring: This chapter provides an outline for how the City will implement the GHG reduction measures and includes guidelines for monitoring and updating the CAP. In addition, this chapter will describe the process for streamlining GHG emissions analysis during CEQA environmental review for future projects consistent with the GPU. The CAP Consistency Checklist contains measures that are required to be implemented on a project-by-project basis to achieve the City's 2030 and 2035 GHG reduction targets. By implementing the measures in the Checklist, a development project would demonstrate its consistency with the CAP Update. The Checklist is provided in **Appendix C**.

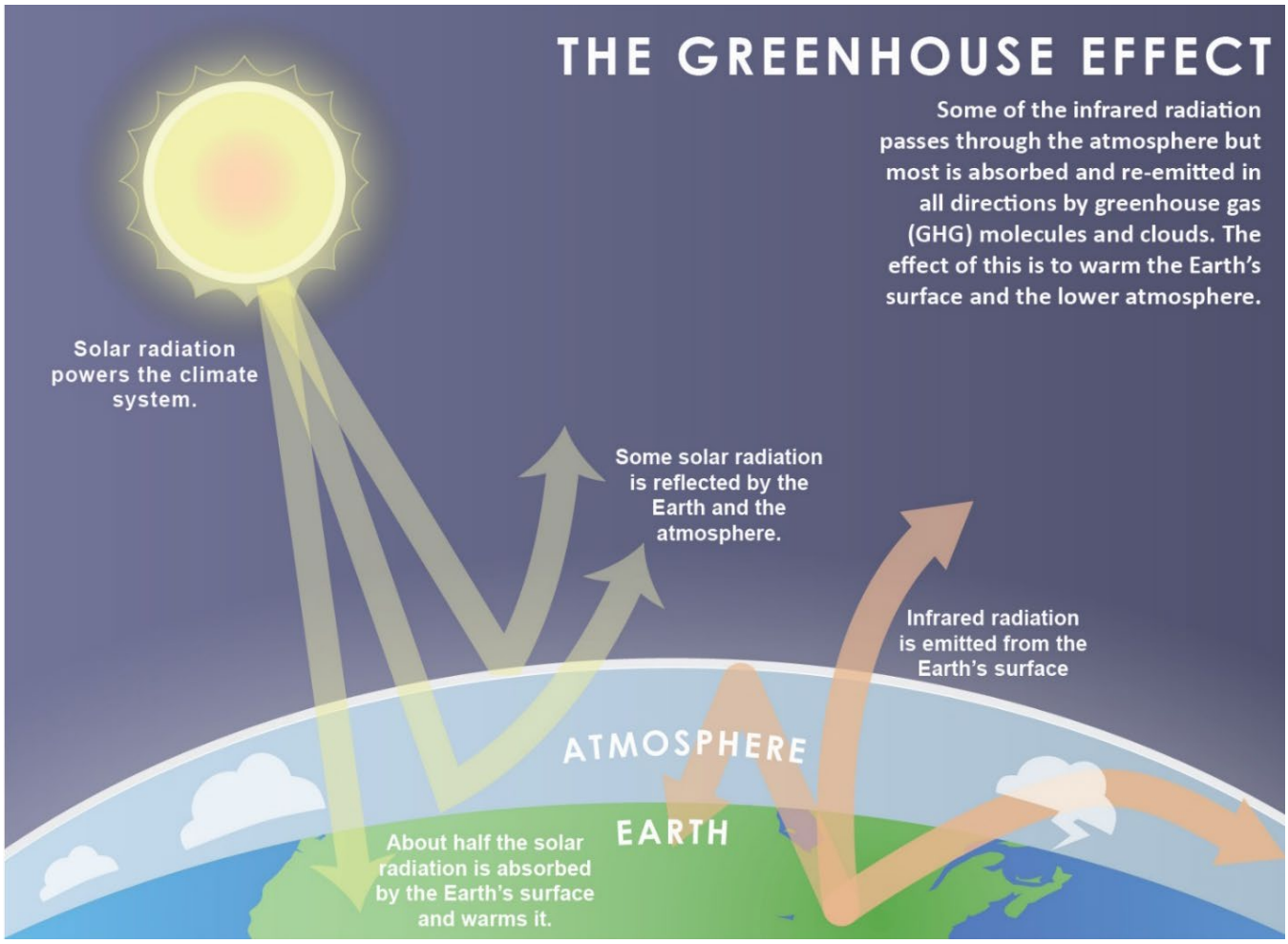
1.2 Introduction to Climate Change Science and Impacts

The greenhouse effect, as outlined below in **Figure 1-1**, results from a collection of atmospheric gases called GHGs that insulate the Earth and help regulate its temperature. These gases, mainly water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), ozone (O_3), and chlorofluorocarbons (CFCs) all act as effective global insulators, reflecting Earth's visible light and infrared radiation to keep temperatures on Earth stable. Without the greenhouse effect, Earth would not be able to support life as we know it.

> IPCC defines "extremely likely" as a 95 percent probability of occurrence/outcome. Additionally, multiple studies published in peer-reviewed scientific journals show that 97 percent or more of actively publishing climate scientists agree that climate change trends over the past century are "extremely likely" due to human activities.

Human activities (e.g., the burning of fossil fuels for transportation energy, increasing rates of deforestation and development) have contributed to elevated concentrations of GHGs in the atmosphere. These human-caused (i.e., anthropogenic) emissions of GHGs have resulted in above-normal ambient concentrations of GHGs, intensifying the greenhouse effect and leading to a trend of unnatural warming of the Earth's climate, known as global climate change, or global warming. There is a strong scientific consensus that it is "extremely likely" that most of the changes in the world's climate during the last 50 years are a result of anthropogenic GHG emissions (IPCC 2014).

Furthermore, short-lived climate pollutants (SLCPs), which are GHGs that remain in the atmosphere for a shorter period of time than long-lived climate pollutants (i.e., CO_2 and N_2O), are powerful climate forcers that have an outsized impact on climate change in the near term. Despite their relatively shorter atmospheric lifespan, their potency in terms of how they heat the atmosphere (i.e., global warming potential) can be tens, hundreds, or even thousands of times greater than that of CO_2. SLCPs include CH_4; F-gases, including hydrofluorocarbons (HFCs), perflurocarbons (PFCs), and sulfur hexafluoride (SF_6); and black carbon.



Source: Ascent Environmental 2019.

Figure 1-1 The Greenhouse Effect

Global climate change is the driver behind shifting seasons, rising average temperatures, changes in precipitation patterns, shrinking mountain snowpack, higher sea levels, and other impacts to biological resources and humans. The impact of climate change in California varies across the state due to diversity in biophysical setting, climate, and jurisdictional characteristics. Annual temperatures in the City are projected to increase steadily over time as a result of climate change. While forecasts generally show little change in total annual precipitation in California, even modest changes could have a significant effect on California ecosystems that are conditioned to historical precipitation levels.

A vulnerability assessment was prepared to identify the anticipated impacts of climate change on the City's residents and assets, including as a result of increased temperature, extreme heat events and heat waves, urban heat island effect, changes in precipitation patterns, increased wildfire risk, and increased flood risk (**Appendix D**). In summary, by 2099 the annual average maximum temperature in the city is projected to increase by 5.1 to 10.4 °F (CEC 2018). The historically low and infrequent number of extreme heat events (no more than one per year) are expected to rise to two to 11 heat waves per year by 2099 (CEC 2018). With projected increased temperatures and extreme heat events the intensity of urban heat islands within the city compared to surrounding rural areas is expected to rise. The City's historical annual average (1950 to 2005) precipitation of 15.0 inches is expected to rise to 15.0 to 21.4 inches per year by 2099 (CEC 2018). In addition, as the City experiences increased intensity as well as unreliable participation patterns, increased flooding events and periods of drought are likely to occur. Increased temperatures and frequency of extreme heat events, along with changes in precipitation patterns, can lead to an increase in the frequency and intensity of wildfires (OPR 2018).

1.3 Regulatory Framework

With the adoption of the 2011 CAP, the City has already taken steps to reduce GHG emissions and adapt to climate change. The efforts adopted by the City in 2011 and the State's legislative background are summarized in the following sections, providing important guidance and policy drivers for the CAP Update.

1.3.1 State of California

In 2005, Governor Schwarzenegger signed Executive Order S-3-05, which directed California to reduce GHG emissions to 1990 levels by 2020, and to 80 percent below 1990 levels by 2050. A year later, in 2006, the Global Warming Solutions Act (AB 32) was passed, establishing regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions. AB 32 put a cap on GHG emissions, setting a target of reducing GHG emissions to 1990 levels by 2020. As part of its implementation of AB 32, the CARB developed a Scoping Plan in 2008. The Scoping Plan, along with its Update in 2014, describes the approach California will take to reduce GHGs to achieve reduction targets and goals. California is currently on track to meet or exceed the AB 32 current target of reducing GHG emissions to 1990 levels by 2020.

> As directed by AB 32, SB 32, and Executive Orders B-30-15 and S-3-05, the State aims to reduce annual GHG emissions to:
> - 1990 levels by 2020;
> - 40 percent below 1990 levels by 2030; and
> - 80 percent below 1990 levels by 2050 (per EO S-3-05).

In 2015, Governor Brown signed Executive Order B-30-15, establishing a new GHG emissions reduction target of 40 percent below 1990 levels by 2030. This target aligns with those of leading international governments such as the 28-nation European Union which adopted the same target in October 2014. Executive Order B-30-15 also directed CARB to update the AB 32 Scoping Plan to reflect the path to achieving the 2030 target. In September 2016, Governor Brown also signed SB 32, which codified into statute the mid-term 2030 target of Executive Order B-30-15. The 2030 GHG emissions reduction target places California on a trajectory towards meeting the goal of reducing statewide emissions to 80 percent below 1990 levels by 2050.

The approved 2017 Scoping Plan lays out the framework for achieving the 2030 reductions as established in Executive Order B-30-15 and SB 32. The 2017 Scoping Plan replaces the previous version and identifies GHG reductions by emissions sector to achieve a statewide emissions level that is 40 percent below 1990 levels by 2030.

In addition to legislation setting statewide GHG reduction targets, SB 375, which became law in 2008, is intended to reduce GHG emissions from passenger cars and light-duty trucks by more closely aligning regional transportation planning with regional housing allocations and local land use planning. SB 375 requires metropolitan planning organizations, including the Southern California Association of Governments (SCAG), to adopt a sustainable communities strategy (SCS) or Alternative Planning Strategy as part of its regional transportation plan (RTP) showing how it would, if implemented, achieve CARB-established targets for per capita reductions of GHG emissions from passenger cars and light duty trucks by 2020 and 2035, relative to a 2005 baseline. The current version of the SCAG RTP/SCS was adopted in April 2016 and, if implemented, demonstrates that the SCAG region would achieve its passenger vehicle GHG reduction targets by reducing emissions 8 percent below 2005 levels by 2020 and 13 percent below 2035 levels by 2035. SCAG published a draft version of its updated RTP/SCS in November 2019, which, if implemented shows how the SCAG region would achieve the 8 percent target by 2020 and an updated target of 19 percent by 2035.

To effectively address the challenges that a changing climate will bring, the State also prepared the 2009 California Climate Adaptation Strategy, which highlights climate risks and outlines possible solutions that can be implemented throughout the State. This Strategy was updated in 2014, and most recently 2018, and is now known as *Safeguarding California*. In 2016, the State also developed the Safeguarding California Implementation Action Plans.

Other federal and State regulations relevant to the CAP Update are identified below in **Table 1-1**.

Table 1-1 Relevant Federal and State Regulations

Federal	Federal Clean Air Act (CAA)	In 2007, the U.S. Supreme Court ruled that CO_2 is an air pollutant as defined under the CAA, and the U.S. Environmental Protection Agency has the authority to regulate emissions of GHG.
Federal[1]	Corporate Average Fuel Economy (CAFE) Standards	The federal CAFE Standards determine the fuel efficiency of certain vehicle classes in the U.S.
State	Executive Order S-01-07	Executive Order S-01-07 set forth a low carbon fuel standard for California, whereby the carbon intensity of California's transportation fuels is to be reduced by at least 10 percent by 2020.
State	AB 1493	AB 1493 (Pavley) required CARB to develop and adopt regulations that reduce GHGs emitted by passenger vehicles and light-duty trucks.
State	AB 197	AB 197 creates a legislative committee to oversee CARB and requires CARB to take specific actions when adopting plans and regulations pursuant to SB 32 related to disadvantaged communities, identification of specific information regarding reduction measures, and information regarding existing GHGs at the local level.
State	SB 350	SB 350 requires the State to set GHG emission reduction targets for the load serving entities through Integrated Resource Planning. SB 350 requires an increase in the Renewable Portfolio Standard to 50 percent by 2030 and doubling energy savings in electricity and natural gas end uses.
State	RPS	Requires California energy utilities to procure 33 percent of electricity from renewable sources by 2020.
State	SB 100	Requires California energy utilities to procure 60 percent of electricity from renewable sources by 2030 and 100 percent from renewable and zero-carbon sources by 2045.
State	California Building Efficiency Standards (Title 24, Part 6)	Requires all new buildings in California to comply with energy efficiency standards established by CEC.
State	AB 341	California target to achieve a 75 percent solid waste diversion target by 2020.
State	Pavley Clean Car Standards	Establishes GHG emission reduction standards for model years 2009 through 2016 that are more stringent than federal CAFE standards.
State[1]	Advanced Clean Car Standards	Establishes GHG emission reduction standards for model years 2017 through 2025 that are more stringent than federal CAFE standards.
State	SBX7-7	Requires a 20 percent reduction in per capita water usage by 2020.
Federal	Fuel Efficiency Standards for Medium- and Heavy-Duty Vehicles	Establishes fuel efficiency standards for medium- and heavy-duty engines and vehicles.

Notes: AB = Assembly Bill; CAFE = Corporate Average Fuel Economy; CEC = California Energy Commission; EPA = Environmental Protection Agency; GHG = greenhouse gas; RPS = Renewables Portfolio Standard; SB = Senate Bill; VMT = vehicle miles traveled.

Source: Ascent Environmental 2019.

1. On August 2, 2018, the National Highway Traffic Safety Administration (NHTSA) and U.S. Environmental Protection Agency (EPA) proposed the Safer Affordable Fuel-Efficient Vehicles Rule (SAFE Rule). This rule addresses emissions and fuel economy standards for motor vehicles and is separated in two parts as described below.

   Part One "One National Program" (84 FR 51310) revokes a waiver granted by EPA to the State of California under Section 209 of the Clean Air Act to enforce more stringent emission standards for motor vehicles than those required by EPA for the explicit purpose of greenhouse gas emission (GHG) reduction, and indirectly, criteria air pollutant and ozone precursor emission reduction. This revocation became effective on November 26, 2019, restricting the ability of CARB to enforce more stringent GHG emission standards for new vehicles and set zero emission vehicle mandates in California. CARB has estimated the vehicle tailpipe and evaporative emissions impacts to criteria air pollutants from SAFE Rule Part One and has provided off-model adjustment factors to adjust emissions output from CARB's Emission Factor (EMFAC) model.

   Part Two would address Corporate Average Fuel Economy (CAFE) standards for passenger cars and light trucks for model years 2021 to 2026. This rulemaking proposes new CAFE standards for model years 2022 through 2026 and would amend existing CAFE standards for model year 2021. The proposal would retain the model year 2020 standards (specifically, the footprint target curves for passenger cars and light trucks) through model year 2026, but comment is sought on a range of alternatives discussed throughout the proposed rule. This proposal addressing CAFE standards is being jointly developed with EPA, which is simultaneously proposing tailpipe carbon dioxide standards for the same vehicles covered by the same model years. As of January 31, 2020, Part Two is not final. The timing of a final SAFE Rule Part Two and the outcome of any pending or potential lawsuits (and how such lawsuits could delay or affect its implementation) are unknown at this time.

1.3.2 City of Murrieta

The City's 2011 CAP developed GHG emission reduction measures in accordance with the policies of the 2011 General Plan. From these policies the 2011 CAP identified seven emission reduction strategies and the corresponding policies to support them. Table 1-2 presents the seven strategies and the 2011 General Plan policies that were identified in the 2011 CAP as GHG reduction measures to achieve the 2020 GHG reduction target. These measures were used to inform development of measures for the CAP Update and in some cases have been expanded upon to meet the new targets for 2030 and 2035.

Table 1-2 Greenhouse Gas Reduction Strategies and Measures from the 2011 CAP Strategies

Reduction Strategies	Reduction Measures
Community Involvement Strategy	**CIR-6.12** Increase public education about public transit options. **CSV-15.1** Consider renewable energy generation systems on City-owned property for use in municipal operations. **CSV-15.2** Reduce fuel consumption and emissions from municipal fleet vehicles. **CSV-15.3** Continue to implement waste reduction programs at municipal facilities. **CSV-15.4** Consider retrofitting and/or installing water- and energy-efficient fixtures and appliances in municipal facilities, where appropriate and feasible. **CSV-15.5** Encourage the use of recycled water where appropriate and feasible in City parks and landscaped areas, and demonstrate preferred techniques for water efficient landscaping, including the use of native plants. **CSV-15.6** Demonstrate cutting-edge green building techniques when constructing and retrofitting municipal buildings. **CSV-15.7** Use energy-efficient lighting in parks, streets and other public places. **HC-1.3** Encourage that the municipal vehicle fleet achieve the highest possible number of fuel-efficient and low emissions vehicles commercially available.
Land Use and Community Vision Strategy	**LU-1.6** Promote future patterns of development and land use that reduce infrastructure construction costs and make better use of existing and planned public facilities. **LU-4.3** Locate multiple-family housing adjacent to jobs, retail, schools, open space, public transportation, and transportation corridors. **LU-5.1** Support redevelopment and transition of obsolete industrial and manufacturing sites for commercial, flextech, and/or mixed-use development, reflective of current market demand. **LU-5.2** Promote quality design and development practices that reduce environmental impacts. **LU-6.1** Encourage flexibility in land use regulations to respond to requirements of new and emerging business and industry types. **LU-7.4** Discourage the construction of marginal, disjointed strip center commercial development within the city. **LU-7.8** Encourage consolidation of parking and reciprocal access agreements between adjacent business and commercial center property owners. **LU-8.1** Encourage integrated development that incorporates a mix of uses (residential, commercial, office) in mixed use or transit-oriented development areas. **LU-8.2** Encourage workplace development in close proximity to residences in mixed use or transit-oriented development areas. **LU-8.4** Design mixed uses or transit-oriented development projects to: ▶ Create a pleasant walking environment to encourage pedestrian activity. ▶ Create lively streetscapes, interesting urban spaces, and attractive landscaping. ▶ Provide convenient shopping opportunities for residents close to their residence. ▶ Integrate with surrounding uses to become a part of the neighborhood rather than an isolated project. ▶ Use architectural elements or themes from the surrounding area, as appropriate. ▶ Provide appropriate transition between land use designations to minimize neighbor compatibility conflicts.

Table 1-2 Greenhouse Gas Reduction Strategies and Measures from the 2011 CAP Strategies

Reduction Strategies	Reduction Measures
	LU-8.5 Encourage the creation of multi-modal transit opportunities with a healthy mix of businesses, childcare, senior services, and housing. **LU-8.6** Encourage higher density residential, commercial, and employment development near a future Metrolink or High Speed Rail Station, along other major public transportation routes, and at other suitable locations. **LU-8.7** Amend the Development Code to implement mixed use zoning districts that provide development standards for mixed use development, which should address minimum density and intensity requirements; allowable uses; horizontal and/or vertical mix of uses, building heights; and parking standards. **LU-8.8** Evaluate mixed use projects to ensure that there is an adequate mix of uses on the site and in the area. **LU-9.1** Encourage human-scale urban design on the neighborhood, block, and building scale. **LU-9.2** Encourage active and inviting pedestrian-friendly street environments that include a variety of uses within commercial, mixed use or transit-oriented development areas. **LU-9.3** Encourage new neighborhoods to be built on a pedestrian-scale, within walking distance of parks, neighborhood-serving commercial areas, and other neighborhood amenities. **LU-9.4** Differentiate between areas zoned as neighborhood commercial and community commercial, encouraging unique, pedestrian-oriented, and neighborhood-serving uses in the neighborhood commercial zone. **LU-9.5** Promote commercial uses near residential neighborhoods that serve local residents and create neighborhood-gathering places. **LU-9.6** Provide pedestrian-oriented urban design through creative use of site development standards. **LU-9.7** Encourage development patterns to become more conducive to short, local, and walkable trips, which could increase opportunities for physical activity and decrease time spent driving. **LU-9.8** Consider infill locations for higher education facilities to capitalize upon existing or create synergies with surrounding uses. **LU-10.1** Prepare and use design guidelines to encourage high-quality, pedestrian oriented design that enhances the public realm. **LU-10.2** Consider preparation and adoption of a Street Master Plan that addresses walkability and streetscape. **LU-10.3** Consider that the development of new residential block lengths are no more than 800 feet on any one side, and no longer than 600 feet on average per side, creating a street network that enables multiple routes for pedestrians, cyclists, and vehicles through a neighborhood. **LU-10.4** Discourage physical barriers, such as arterial streets, transit or utility rights-of-way, or very long blocks without through-streets, between and within neighborhoods and neighborhood centers. If physical barriers are unavoidable, provide safe and comfortable crossings for pedestrians and cyclists. **LU-10.5** Update the Development Code to create walkability, and interesting and varied pedestrian environments. **LU-10.6** Encourage new businesses to have a pedestrian-accessible main entrance that faces the street, as appropriate. **LU-10.7** Encourage well-designed covered or structured parking instead of surface parking lots. **LU-10.8** Encourage new surface off-street parking to be located behind or to the side of buildings, as appropriate. **LU-10.9** Encourage ground-floor structured parking to be buffered from the pedestrian environment through strategies such as wrapping the structure with active retail uses, placing entrances off the street, and screening with landscaping or art. **ED-3.1** Support a diverse range of business activities including professional/technical, information, technology-focused manufacturing, research and development, including medical research and research institutions, educational services, medical/health services, and financial services. **ED-3.2** Promote Murrieta as a center for medical/health services and technology through active

Table 1-2 Greenhouse Gas Reduction Strategies and Measures from the 2011 CAP Strategies

Reduction Strategies	Reduction Measures
	encouragement and recruitment of medical office, medical research, and health care facilities around the Loma Linda University Medical Center, South Murrieta Business Corridor, and confluence of the I-15/I-215 Freeways. **ED-3.3** Create incentives to attract new businesses and industries that provide employment opportunities that match the education and occupational skill levels of Murrieta residents. **ED-3.4** Develop an economic base that attracts jobs and exports products and services by capitalizing on the City's strategic location and relatively lower land prices between greater Los Angeles/Orange County metro and San Diego market regions. **ED-4.2** Encourage retail development, expansion, and remodeling projects that can effectively reverse or minimize outflows of local resident expenditures to retail facilities beyond the City limit. **ED-5.1** Encourage flex-tech buildings within business corridors and higher intensity office uses along freeway corridors with adequate visibility, convenient access, and future transit-oriented opportunities. **ED-6.1** Encourage and support the development of institutions of higher education to serve educational pursuits of area residents and provide a highly skilled employment pool attractive to business investment and economic growth. **ED-6.2** Support the development of technical colleges and training institutions that build job skills commensurate with the growth of the economic base, particularly in the emerging health care services industry and the need for doctors, nurses, and other trained personnel. **ED-8.1** Encourage and market to employers that provide employment opportunities commensurate with the education and skills of Murrieta residents. **ED-10.5** Consider opportunities for the development of higher-density and mixed-use residential uses to support commercial development within the Historic Downtown. **AQ-6.3** Encourage non-polluting industry and clean green technology companies to locate to the City.
Transportation and Mobility Strategy	**LU-22.6** Encourage the development of an trail system within the Multiple Species Habitat Conservation Plan (MSHCP) and other open space areas that connects to a trails system within or adjacent to the existing and future street systems, including linkage through areas east of Warm Springs Creek (such as but not limited to a transitional buffer area) to the open space corridor along Adobe Creek. Trails adjacent to streets should allow for multiple users and provide buffers between vehicles and trail users. **LU-24.2** Continue the expansion of a traditional town development pattern with a grid street design and urban land use intensities to support a pedestrian-oriented environment. **LU-24.6** Encourage mixed-use development projects within the Historic Downtown that create a pedestrian style living environment and encourage use of mass transit. **LU-25.2** Establish a strong role in the implementation of Proposition 1A with the California High Speed Rail Authority (CHSRA). **CIR-1.1** Ensure the transportation system can adequately serve the concentrations of population and employment activities identified by the Land Use Element. **CIR-1.9** Provide a coordinated traffic control system that moves traffic within and through the City in an efficient and orderly manner. Upgrade systems as technology evolves. **CIR-1.11** Support the implementation of complete streets through a multi-modal transportation network that balances the needs of pedestrians, bicyclists, transit riders, mobility-challenged persons, older people, children, and vehicles while providing sufficient mobility and abundant access options for existing and future users of the street system. **CIR-2.3** Provide a circulation network that accommodates the safe and efficient movement of all forms of non-motorized travel. **CIR-2.5** Include paved shoulders on all roads in non-urban areas that can be used by cyclists and pedestrians. **CIR-2.6** Explore the use of traffic calming measures on streets with high incidences of speeding and/or history of collisions. **CIR-2.7** Publish and promote safe pedestrian and bike routes through creating an accurate citywide map

Table 1-2 Greenhouse Gas Reduction Strategies and Measures from the 2011 CAP Strategies

Reduction Strategies	Reduction Measures
	and posting pedestrian/cyclist-scale wayfinding signage.
	CIR-2.12 Consider the development and implementation of Pedestrian Safety Guidelines that also include streetscape standards that emphasize pedestrian and cyclist safety (lighting, trees, greenery, traffic calming measures, etc.).
	CIR-5.9 Coordinate with Western Riverside Council of Governments, Riverside County, and Riverside County Transportation Commission to identify, protect, and pursue opportunities for public transit along major transportation corridors, and future high speed rail service, which connect Murrieta to other population centers.
	CIR-5.10 Support the siting and development of a Metrolink Station(s) within Murrieta along the I-15 and/or I-215 corridors.
	CIR-5.11 Coordinate with California High Speed Rail Authority, Riverside Transit Authority, and City of Temecula on the siting and development of a California High Speed Rail Intermodal Transit Center.
	CIR-5.14 Encourage new large residential, commercial, or employment developments to locate on existing and planned transit routes.
	CIR-6.1 Encourage alternatives to single-occupancy vehicle transportation such as rail, public transit, paratransit, walking, cycling, and ridesharing.
	CIR-6.2 Support a variety of transit vehicle types and technologies to serve different transportation needs.
	CIR-6.3 Work with the Riverside Transit Agency, Murrieta Chamber of Commerce, and/or the City's Economic Development Department to conduct a travel/commute survey with the intent of creating vanpools, carpools, and employment center shuttles to reduce single occupant vehicles.
	CIR-6.4 Seek opportunities for funding that goes to support alternative forms of transportation.
	CIR-6.5 Support the dedication and/or construction of appropriate facilities in support of a public transportation system.
	CIR-6.6 Identify opportunities to implement the Western Riverside County Non-Motorized Transportation Plan within key activity centers of the City through the development of non-motorized transportation corridors and facilities (i.e., neighborhood electric vehicle routes, bikeways, pedestrian paths, sidewalks/paths).
	CIR-7.1 Encourage future developments to provide an internal system of sidewalks/pathways linking schools, shopping centers, and other public facilities with residences.
	CIR-7.2 Require pedestrian access from the interior of new residential areas to public transit stops.
	CIR-7.3 Encourage safe pedestrian walkways and ensure compliance with the Americans with Disabilities Act (ADA) requirements within all developments.
	CIR-7.4 Consider the development and implementation of Pedestrian Friendly Street Standards.
	CIR-7.5 Provide pedestrian amenities such as benches, trees, landscaping, and shade trees to encourage people to walk to destinations.
	CIR-7.6 Promote improved demand responsive transit services for elderly and disabled persons.
	CIR-7.7 Ensure visibility and access for pedestrians and encourage the removal of barriers (walls, fences) to allow for safe and convenient movement.
	CIR-7.8 Work with Riverside County Transportation Commission, local retirement homes, the Senior Center, and other community groups to expand affordable and reliable transportation options for older adults and disabled persons.
	CIR-8.1 Create, update, and implement a master plan for non-motorized travel throughout the City, including multi-use trails, off-street paved bikeways, on-street bikeways, and related amenities.
	CIR-8.2 Promote bicycle and pedestrian trails along major home to work and other travel routes.
	CIR-8.10 Work with adjacent property owners to create an interconnected trail that extends along the public right-of-way, which will benefit business by increasing exposure and access, and benefit the community through encouraging fitness, improved access, and a connected community.
	CIR-8.11 Coordinate the location of multi-use trails to connect with regional trail systems, where feasible.
	CIR-8.12 Pursue funding or grant opportunities to plan, construct, and maintain pedestrian, bicycle, and

Table 1-2 Greenhouse Gas Reduction Strategies and Measures from the 2011 CAP Strategies

Reduction Strategies	Reduction Measures
	multi-use trails. **CIR-8.10** Work with adjacent property owners to create an interconnected trail that extends along the public right-of-way, which will benefit business by increasing exposure and access, and benefit the community through encouraging fitness, improved access, and a connected community. **CIR-8.11** Coordinate the location of multi-use trails to connect with regional trail systems, where feasible. **CIR-8.12** Pursue funding or grant opportunities to plan, construct, and maintain pedestrian, bicycle, and multi-use trails. **CIR-8.13** Maintain a map or maps of current bikeways and multi-use trails, and make the map(s) available to the public. **AQ-4.1** Cooperate with local, regional, State, and Federal agencies to reduce vehicle miles traveled (VMT) and consequent emissions through job creation. **AQ-4.2** Improve jobs/housing balance by encouraging the development, expansion, and retention of business. **AQ-4.3** Improve access of businesses to local institutions that provide education and job training to prepare local residents to fill the jobs local industries create. **AQ-4.4** Encourage a mix of housing types that are affordable to all segments of the population and are near job opportunities to further reduce vehicle trips. **AQ-5.1** Encourage employers to implement transportation demand management (TDM) measures, such as the following programs to reduce trips and vehicle miles traveled: ▶ Transit subsidies ▶ Bicycle facilities ▶ Alternative work schedules ▶ Ridesharing ▶ Telecommuting and work-at-home programs ▶ Employee education ▶ Preferential parking for carpools/vanpools **AQ-5.3** Promote use of fuel-efficient and low-emissions vehicles, including Neighborhood Electric Vehicles. **AQ-5.4** Encourage the use of lowest emission technology buses in public transit fleets. **AQ-5.6** Manage the municipal vehicle fleet to achieve the highest possible number of fuel-efficient and low emissions vehicles commercially available. **AQ-5.7** Reduce industrial truck idling by enforcing California's five (5) minute maximum law, requiring warehouse and distribution facilities to provide adequate on site truck parking, and requiring refrigerated warehouses to provide generators for refrigerated trucks.
Energy Use and Conservation Strategy	**CSV-12.1** Ensure that all developments comply with energy efficiency requirements as mandated by the applicable Building Code. **CSV-12.2** Work with energy utilities to encourage and incentivize the retrofitting of building systems with energy-conserving fixtures and appliances. **CSV-12.3** Support the on-site installation and use of renewable energy generation systems for residential, commercial, institutional, and industrial uses. **CSV-12.4** Explore options for addressing aesthetic concerns about renewable energy systems that do not unreasonably restrict the use of these systems, remaining consistent with State law. **CSV-12.5** Consider non-commercial solar power generation in residential areas. **CSV-12.6** Encourage new development projects and significant rehabilitation or expansion projects to incorporate innovative energy conservation or generation amenities such as electric vehicle charging stations, solar canopies, and carports. **CSV-12.7** Support bulk purchasing or financing packages of renewable energy purchasing for residential, business and government facilities. **CSV-12.8** Promote community awareness of opportunities to conserve energy and use renewable energy.

Table 1-2 Greenhouse Gas Reduction Strategies and Measures from the 2011 CAP Strategies

Reduction Strategies	Reduction Measures
	CSV-14.1 Ensure all applicable construction projects comply with the California State Green Building Standards Code. **CSV-14.2** Encourage the integration of other principles of green building into development standards and guidelines, looking for opportunities to realize other benefits such as improved health and increased bicycle transportation. **CSV-14.3** Identify and reduce regulatory barriers to green building. **CSV-14.4** Raise community awareness regarding green building methods, incentives, and benefits at community events, the planning counter, and on the City's website.
Water Use and Efficiency Strategy	**INF-2.1** Support water district efforts to promote the use of recycled water where infrastructure is available, and to expand infrastructure where it does not currently exist. **INF-2.2** Work with the water districts to explore options for expanding recycled water pipelines to serve City parks and facilities that are near existing infrastructure, such as California Oaks Sports Park and Town Square. **INF-2.3** Continue to require installation of recycled water systems for landscaping, unless there is an exemption from the applicable water district. **INF-2.4** Encourage other major users of irrigation, such as schools and private golf courses, to connect to nearby recycled water pipelines. **INF-2.5** Coordinate with water districts to encourage innovative demonstrations of nonpotable uses for recycled water and/or groundwater recharge in City facilities and industrial applications. **CSV-1.2** Promote the maximization of water supplies through conservation, water recycling, and groundwater recharge. **CSV-1.4** Support water purveyors in promoting a City-wide recycled water system through project review and coordination with water districts. **CSV-2.1** Ensure that all developments comply with water efficiency requirements, as mandated by the applicable Building Code. **CSV-2.2** Work with water districts to encourage and incentivize the retrofitting of building systems, both indoor and outdoor, with water-conserving fixtures and appliances. **CSV-2.4** Promote water efficient landscaping practices through outreach efforts, project review, and enforcement of City, regional, or State code requirements.
Waste Reduction and Recycling Strategy	**INF-1.15** Continue to implement the City's residential informational and outreach program by providing homeowners with Best Management Practices (BMP) for activities such as, but not limited to: ▸ Disposal of fats, oils, and grease ▸ Disposal of garden waste ▸ Disposal of household hazardous waste ▸ Disposal of pet waste ▸ Garden care and maintenance ▸ Vehicular repair and maintenance ▸ Vehicular washing **CSV-13.1** Continue to comply with the landfill diversion requirements of the Integrated Waste Management Program. **CSV-13.2** Ensure that non-residential and multi-family developments provide readily accessible areas for recycling (at a minimum) paper, corrugated cardboard, glass, plastics and metals, as required by California law. **CSV-13.3** Maximize community reuse and recycling of products and materials through waste management contracts and public education. **CSV-13.4** Incentivize businesses that provide solutions for recycling and re-use of specific waste streams such as food waste and cooking oils. **CSV-13.5** Work with local landfills or green waste centers to develop the infrastructure for a composting

Table 1-2 Greenhouse Gas Reduction Strategies and Measures from the 2011 CAP Strategies

Reduction Strategies	Reduction Measures
	program. **CSV-13.6** Provide public outreach and education workshops and information on the composting program. **CSV-13.7** Work with local landfills or green waste centers, or other interested parties, as appropriate, to implement a community-wide food scrap collection and composting program.
Open Space Strategy	**CSV-9.1** Identify and protect native trees, trees of historic or cultural significance, and mature trees, consistent with the Tree Preservation Ordinance. **CSV-9.2** Consider the establishment of street tree standards and a program for street tree planting, maintenance, and replacement. **CSV-9.3** Promote the use of street trees as a buffer between pedestrians and motorized traffic. **CSV-9.4** Encourage the planting of street trees in linear planting beds rather than tree wells to support long-living healthy trees. **CSV-9.5** Encourage the planting of trees in private yards and properties. **CSV-9.6** Maintain a guide to preferred trees, shrubs, and ground cover plants of noninvasive species, or refer private parties to an existing guide that meets City needs to assist private landscaping efforts. **CSV-9.7** Allow edible landscaping such as fruit trees, plants that provide foraging opportunities for wildlife, and community gardens on public and private property. **CSV-9.8** Encourage any new landscaped areas requiring permits to respect and incorporate the distinctive elements of the existing community landscape, including the retention of existing trees, to the maximum extent feasible. **CSV-9.9** Promote the use of native plant species in public landscaping of parks, schools, medians and planter strips, as well as in private development throughout the City. **CSV-10.1** Allow agricultural uses to continue in rural residential areas. **CSV-10.2** Consider ways to allow small-scale urban agriculture in parks, schools, and neighborhoods. **CSV-10.3** Ensure that residents are permitted to grow fruits and vegetables in their yards, so long as there are not significant negative impacts to adjacent property owners. **CSV-10.4** Encourage and support the use of public lands for community gardens and other food production facilities, when feasible. **CSV-10.5** Support opportunities for local food production and access, such as farmer's markets, community gardens, harvest sharing programs, and community supported agriculture programs. **CSV-10.6** Encourage local farmers to sell fresh food locally. **CSV-10.7** Allow public facilities such as schools, libraries, and community centers to be used as Community Supported Agriculture pick-up sites, where feasible. **ROS-7.1** Preserve and enhance open space resources in Murrieta. **ROS-7.2** Designate open space to preserve habitat and scenic views of natural areas. **ROS-7.3** Seek opportunities to designate open space along waterways, while also providing for the development of trails. **ROS-7.4** When possible, link open space and parks for the movement of wildlife and people. **ROS-8.1** Encourage the provision of parks, recreation facilities, and/or open space in new development and redevelopment projects. **ROS-8.2** Ensure that new residential developments provide for recreation needs of residents through development fees and park dedication. **ROS-8.3** Encourage development that promotes outdoor activity. **ROS-8.4** When reviewing new development or redevelopment projects, refer to the Trails Plan to determine whether right-of-way is needed for trails on the project site. **ROS-9.1** Continue to require that adequate, usable, and permanent private open space is provided in residential developments. **ROS-9.2** Encourage new and existing commercial, office, and industrial development to provide outdoor

Table 1-2 Greenhouse Gas Reduction Strategies and Measures from the 2011 CAP Strategies	
Reduction Strategies	**Reduction Measures**
	green spaces that may be used by employees. **ROS-9.3** Encourage new development and redevelopment projects to incorporate gardens and green spaces with various cultural influences throughout the community to bridge cultures and provide education opportunities. **ROS-9.4** Encourage green spaces planted with a diverse plant palette to promote natural variety, ecosystem services, and enhance the well-being of community residents. **ROS-9.5** Review and modify as necessary, open space requirements for different types of development projects.

1.3.3 California Environmental Quality Act

CEQA is a statute that requires local agencies to identify significant environmental impacts of their actions and, if feasible, avoid or mitigate those impacts. SB 97, passed in 2007, recognized that GHG emissions are within the scope of CEQA environmental review and therefore need to be analyzed as part of the CEQA process.

CAPs can include strategies that can change the physical environment and influence patterns that affect GHG emissions. Activities outlined in a CAP Update are typically subject to discretionary approval and may cause direct or indirect effects on the environment. They are therefore considered a “project” and subject to CEQA compliance. This CAP Update is evaluated as part of the Supplemental EIR for the GPU.

The State CEQA Guidelines (specifically Section 15183.5) establish standards for the contents and approval process of “plans for the reduction of greenhouse gas emissions.” This CAP Update was prepared in accordance with CEQA Guidelines Section 15183.5 and is therefore considered a “qualified” plan for the reduction of GHG emissions. As a qualified plan, the CAP affords development applicants the opportunity to use CEQA streamlining tools for analysis of GHG emissions and related impacts for projects that are consistent with the City’s CAP. The CAP Consistency Checklist contains measures that are required to be implemented on a project-by-project basis to achieve the City’s 2030 and 2035 GHG reduction targets. By implementing the measures in the Checklist, a development project would demonstrate its consistency with the CAP Update. The Checklist is provided in Appendix C.

1.4 Purpose and Objectives of a Climate Action Plan

The CAP Update organizes measures based on sectors evaluated in the 2016 inventory. These sectors include on-road transportation; off-road transportation; residential, commercial, and industrial energy use; solid waste; water; and wastewater. Measures were developed to target improving the GHG efficiency of communitywide and municipal activities. The CAP Update is the City’s approach to comply with the State’s overarching goals of reducing GHG emissions through local GHG reducing actions that can be taken by public agencies, businesses, and residents.

As discussed in greater detail in **Chapters 2** and **3**, the City estimates that communitywide activities emitted 890,575 metric tons of carbon dioxide equivalent ($MTCO_2e$) in 2016. Anticipated growth in GHG emissions for 2030 and 2035 was estimated based on growth forecasts for the City. The GHG reduction targets for the CAP Update have been established in accordance with CARB’s 2017 Scoping Plan recommendations for developing community-wide, plan-level reduction targets. Consistent with the Scoping Plan targets and the State’s 2016 GHG emissions inventory, the City must achieve the following reductions from 2016:

- 40 percent reduction by 2030 (i.e., 536,835 $MTCO_2e$),
- 50 percent reduction by 2035 (i.e., 447,363 $MTCO_2e$), and
- 80 percent reduction by 2050 (i.e., 178,945 $MTCO_2e$).

To achieve these objectives, the CAP Update identifies the gap between projected emissions and the reduction targets, and details reduction measures to comply with statewide and City GHG reduction targets and goals to close the gap.

As part of CAP implementation, each strategy and measure will be periodically assessed and monitored. Reporting on the status of implementation of these measures, periodic updates to the GHG emissions inventory, and other monitoring activities will be performed to track progress in reduction of communitywide GHG emissions. Implementation and monitoring is discussed in more detail in **Chapter 4**.

1.5 Co-Benefits

The measures provided in the CAP Update were primarily developed to reduce GHG emissions within the City, although many will result in other economic, social, or environmental "co-benefits." These benefits may include, but are not limited to, improvements in traffic congestion, air quality, water supply, cost savings, public health, and infrastructure. In addition to reductions in GHG emissions, co-benefits of reduction measures identified in the CAP Update include:

- Cost savings as the result of increasing energy and water use efficiency through technological improvements.
- Economic benefits through saving money with increased efficiency in energy and transportation and improving public health.
- Improved City infrastructure with the installation of safer streets, energy production, and efficient building design.

In addition to these co-benefits, the CAP Update allows the City to maintain control over GHG reduction measures that are most advantageous to the City, while also promoting economic competitiveness and positioning the City for grant funding. The CAP Update also demonstrates that the City is aligned with State targets for reducing GHG emissions. Discussion of reduction measures and their co-benefits are included in **Chapter 3**.

1.6 Summary of Public Involvement

The City held two public workshops and a pop-up event, as noted below, to solicit input on the General Plan and CAP Update and discuss the recent changes in State law related to GHGs and CAPs:

- November 2018 Community Workshop
- December 2018 Pop-up Event
- March 2019 Community Workshop

In addition, in early 2020 the City provided the CAP for public review and comment as part of the draft SEIR for the GPU. Throughout the process the public has provided input, including the desire for improved quality of life, improvements to City infrastructure, open space conservation, property development opportunities and economic development. The CAP provides another vehicle to implement the vision of the General Plan in these areas for a sustainable and healthy community.

2 GREENHOUSE GAS EMISSIONS INVENTORY, FORECASTS AND TARGETS

A greenhouse gas (GHG) emissions inventory is the first step in reducing a community's local emissions contributing to climate change. A GHG inventory is used to identify the major emission sources at the local level as well as specify the activities that result in the release of emissions within a calendar year. Inventories are also used to establish a baseline that is necessary to monitor emission trends over time, to develop reduction targets, and to identify effective GHG emission reduction measures consistent with State regulations.

State laws, executive orders, and plans that inform the City's Climate Action Plan (CAP) Update include Assembly Bill (AB) 32, Senate Bill (SB) 32, Executive Orders B-30-15 and S-3-05, and the California Air Resources Board (CARB) 2017 Climate Change Scoping Plan, which establish statewide targets and goals for GHG reduction relative to a 1990 baseline year. The City's 2011 Climate Action Plan (2011 CAP) used 2009 as its baseline year.

This CAP Update establishes a more recent baseline year of 2016 to reflect more recent available data and changes in data collection and emission quantification methods since 2009. Because the necessary data is not available to estimate the City's 1990 emission levels, proportional targets for the CAP Update were developed that express the level of GHG emissions reductions that would be needed locally between 2016 and future target years to demonstrate consistency with statewide targets. Updating baseline emissions and inventory of recent emissions is consistent with guidance from CARB's 2017 Scoping Plan and the Western Riverside Council of Governments (WRCOG) framework for subregional climate action planning.

What is the purpose of developing an emissions inventory?

- To assist in forecasting emissions into the future;
- To develop reduction targets the City will strive to meet; and
- To guide the development, evaluation, and implementation strategies to achieve these targets.

2.1 2016 Greenhouse Gas Emissions Inventory Overview

The purpose of the GHG emissions inventory is to gain an understanding of the sources and levels of GHG emissions within the City's jurisdiction, as well as to establish a baseline against which a future GHG emission forecast can be compared. The GHG emissions inventory for the City was prepared for calendar year 2016and therefore the inventory is considered the baseline year for the preparation of GHG emissions forecasts and GHG reduction targets that will be used in the City's CAP Update.

- ICLEI's 2019 U.S. Community Protocol for Accounting and Reporting Greenhouse Gas Emissions was used to quantify emissions.

Replacing the 2009 inventory with a 2016 inventory will provide a better understanding of the City's sources of GHG emissions and the activities contributing to those emissions. The baseline's community-wide emissions update was estimated following Local Governments for Sustainability (ICLEI's) *2019 U.S. Community Protocol for Accounting and Reporting Greenhouse Gas Emissions, Version 1.2*. The protocol provides a methodology for estimating GHG emissions including carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), which are major contributors to climate change. This 2016 updated baseline inventory includes a set of communitywide sectors that are considered major sources of the three gases.

The baseline inventory includes emissions from the primary GHGs contributing to climate change. The gases emitted from the inventoried sectors have been converted to a base measure of CO_2 by applying a global warming potential (GWP) to non-CO_2 gases. The comparable unit of measurement between the primary gases for this inventory is expressed as carbon dioxide equivalent (CO_2e). Furthermore, emissions are reported in metric tons of carbon dioxide equivalent ($MTCO_2e$) as standard unit of measuring GHG emissions released into the atmosphere.

- GHG Emissions are measured in Metric Tons of Carbon Dioxide equivalent ($MTCO_2e$).

The 2016 inventory addresses communitywide GHG emissions as opposed to the 2009 baseline which included both communitywide and municipal emissions. However, the methodology and data chosen for this communitywide update inherently incorporate emissions from municipal operations (e.g. water use, wastewater generation, solid waste, and transportation) as municipal operations are a subset of communitywide emissions. The full technical report with further details on the GHG emission inventory and baseline, is incorporated as **Appendix A**.

GHG emissions in this inventory include communitywide emissions resulting from activities occurring and permitted to occur within the existing city limits in 2016. The emissions sectors included in the inventory are on-road transportation; off-road transportation; residential, commercial, and industrial energy use; solid waste; water; and wastewater. These sectors are considered in this inventory because they can be monitored by the City for meeting emission reduction targets. Each sector is briefly described below.

On-Road Transportation: Gasoline and diesel consumption in motor vehicles on local and regional roadways.

Off-Road Transportation: Diesel consumption in off-road vehicles.

Residential Energy: Electricity and natural gas use in residential buildings.

Commercial Energy: Electricity and natural gas use in non-residential buildings.

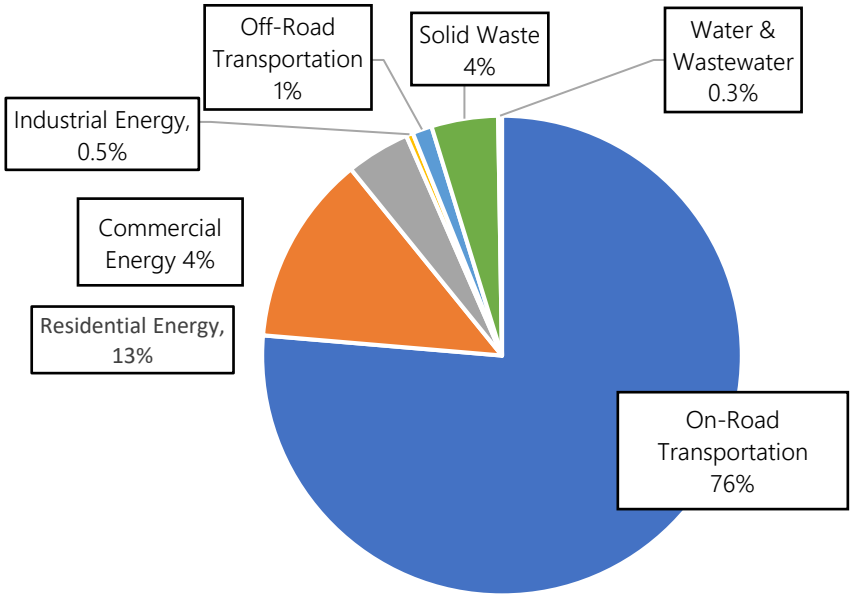
Industrial Energy: Electricity and natural gas use for industrial buildings.

Solid Waste: Total tonnage of waste sent to landfills.

Water and Wastewater: Energy used to transport water to residences and businesses. Fugitive emissions from wastewater treatment facilities and energy used to transport and treat wastewater.

2.1.1 2016 Greenhouse Gas Emissions Inventory Results

In 2016, the City of Murrieta emitted an estimated 890,575 $MTCO_2e$. **Figure 2-1** and **Table 2-1** provide a breakdown of the City's 2016 baseline GHG emissions by sector.



Source: Ascent Environmental, Inc. 2019.

Figure 2-1 2016 City of Murrieta Communitywide Greenhouse Gas Inventory

Table 2-1 2016 City of Murrieta Communitywide Greenhouse Gas Inventory

Sector	Total Emissions ($MTCO_2e$)	Percent of Total
On-Road Transportation	679,920	76%
Off-Road Transportation	11,741	1%
Residential Energy	114,112	13%
Commercial Energy	38,310	4%
Industrial Energy	4,124	1%
Solid Waste	40,038	4%
Water and Wastewater	2,275	0.3%
Total (All Sectors)	***890,575***	***100%***

Notes: Columns may not add to totals due to rounding.

$MTCO_2e$ = metric tons of carbon dioxide equivalent

Source: Data compiled by Ascent Environmental, Inc. 2019.

The largest contributing source to the City's total GHG emissions is the On-Road Transportation sector which accounts for 76 percent of the total emissions in 2016. On-road transportation activities are primarily related to vehicular gasoline and diesel consumption. Emissions associated with this sector were calculated based on estimated vehicle miles traveled (VMT) for all vehicles traveling to/from and within the city. Emissions associated with electricity and natural gas use in residential, commercial, and industrial buildings is the second largest contributor of emissions at a combined 18 percent of the City's inventory in 2016. Emissions calculations for the electricity and natural gas sectors include electricity and natural gas used for water heating and cooling, and non-renewable building energy consumption.

2.2 Emission Forecasts

Estimates of future emissions levels are based on a continuation of current trends in activity and population growth. These forecasts also account for legislation in effect at the time of the CAP Update that could affect emissions in the future. Forecasts provide insights into the scale of local reductions needed ("local gap") to achieve GHG emissions reduction targets, as well as the local effects legislative actions will have on emissions.

The first forecast scenario used in the CAP Update, referred to as the "business-as-usual" (BAU) forecast, assumes that no additional State or federal legislative actions, beyond what have already been adopted, will be made to reduce GHG emissions in the future. They do not account for any GHG emissions reductions associated with the implementation of the CAP Update, or legislative actions, and assumes that population, housing, employment, and transportation activities will grow over time, consistent with growth forecast included in the General Plan Update (GPU). The second forecast scenario known as the Legislative-Adjusted BAU (ABAU) forecast, provides a reduction from the BAU forecast accounting for State and federal actions that are planned to take place in the future, assuming the same demographic trends as BAU forecasts.

A summary of BAU and ABAU forecasts is provided in Table 2-2. Details on how the forecasts were developed and the indicators used to estimate each sector can be found in Appendix A.

Table 2-2 Annual Growth Factors (%)

Factor	2016 to 2020	2020 to 2030	2030 to 2035	2035 to 2050	2016 to 2050
Population	1.07	1.00	0.93	0.94	0.97
Jobs	7.68	5.07	3.63	4.21	4.78
Dwelling Units[1]	1.25	1.15	1.06	1.00	1.00
Vehicle Miles Traveled	1.69	1.52	1.36	1.40	1.46

1. Growth projections included the City's GPU and Supplement EIR includes projections for total households. For purposes of the GHG emissions forecasts presented in this CAP Update, it is assumed that one household equals one dwelling unit.

Source: Iteris, VRPA Technologies, Inc., and Ascent Environmental 2019

2.2.1 Demographic Trends

Forecasted GHG emissions were based on demographic forecasts, including annual population, jobs, and household growth between 2016 and 2050 (for purposes of this CAP Update, it is assumed that one household equals one dwelling unit). Demographic forecasts were developed by Iteris and VRPA Technologies, Inc. for traffic and VMT modeling and were based on the demographics used in the GPU. The GPU's demographic forecasts were estimated up to year 2040 using land use configurations that would be considered under the GPU. Population, jobs, and household growth were extrapolated for year 2050 using the growth rates provided between 2016 and 2040. The City's population is forecasted to increase by 15 percent by 2030, 21 percent by 2035, and 39 percent by 2050 from 2016 levels. Employment in the city is forecasted to increase significantly by 121 percent by 2030, 164 percent by 2035, and 389 percent by 2050 from 2016 levels. Total households are also expected to increase by 18 percent by 2030, 24 percent by 2035, and 40 percent by 2050 from 2016 levels. Daily VMT is forecasted to increase by 24 percent by 2030, 33 percent by 2035, and 64 percent by 2050. Demographic estimates for years 2016 to 2050 are referenced in Appendix A. Table 2-2 shows the annual growth rates for 2020, 2030, 2035 and 2050. To estimate long-term growth trends and to account for variability in short-term growth trends (e.g., 2020-2030), Ascent has used the 2016-2050 annual growth rate in the forecasted BAU and ABAU scenarios.

Table 2-3 shows the population, jobs, household, and daily VMT forecast that was provided by Iteris and VRPA with 2050 projections extrapolated based on the 2016 through 2040 annual growth rate.

Table 2-3 Demographic and Daily Vehicle Miles Traveled Forecast (2016-2050)

Factor	2016	2020	2030	2035	2050
Population	110,897	115,718	127,772	133,798	154,003
Jobs	28,628	38,485	63,128	75,450	139,986
Dwelling Units	35,534	37,341	41,859	44,118	49,912
Daily Vehicle Miles Traveled	4,132,649	4,419,630	5,137,080	5,495,806	6,768,910

Source: Iteris, VRPA Technologies, Inc., and Ascent Environmental 2019

2.2.2 Business-As-Usual Forecasts

The BAU emissions forecasts are assumed to have no additional legislative action to reduce GHG emissions, beyond what has already been appropriated upon adoption of the CAP Update. BAU emissions forecasts were estimated based on the continuation of current trends in activities within the City, and population and employment growth. Annual GHG emissions would increase from 2016 levels under BAU conditions. Despite legislative action and local efforts that have already been adopted to reduce GHG emissions, population, jobs, housing, and VMT growth under the BAU scenario would cause emissions to increase until forecast year 2050. Table 2-4 shows the increase in GHG emissions for each forecast year

2.2.3 Legislative Adjustments

State and federal legislation play a significant role in reducing GHG emissions from activities in the City of Murrieta, as demonstrated by the ABAU scenario. This scenario accounts for a variety of approved legislative actions that will further reduce BAU GHG emissions from the City. The ABAU accounts for the implementation of legislative actions by estimating the impacts of the actions on the various GHG emissions-producing sectors in the CAP Update and adjusting emissions levels accordingly. The ABAU forecasts include State and federal actions only, they do not include local government actions such as the implementation of GHG emissions reduction measures provided in this CAP Update. The ABAU emissions inventory is utilized as the underlying basis to determine reduction targets and the level of reduction needed from the CAP measures. The legislative actions applied to estimate the ABAU are included in Table 1-1. With application of the adopted legislative actions, the City will experience an overall decrease in GHG emissions for the years 2030, 2035, and 2050, as shown in Table 2-4.

Table 2-4 City of Murrieta Emissions Forecasts ($MTCO_2e$/year)

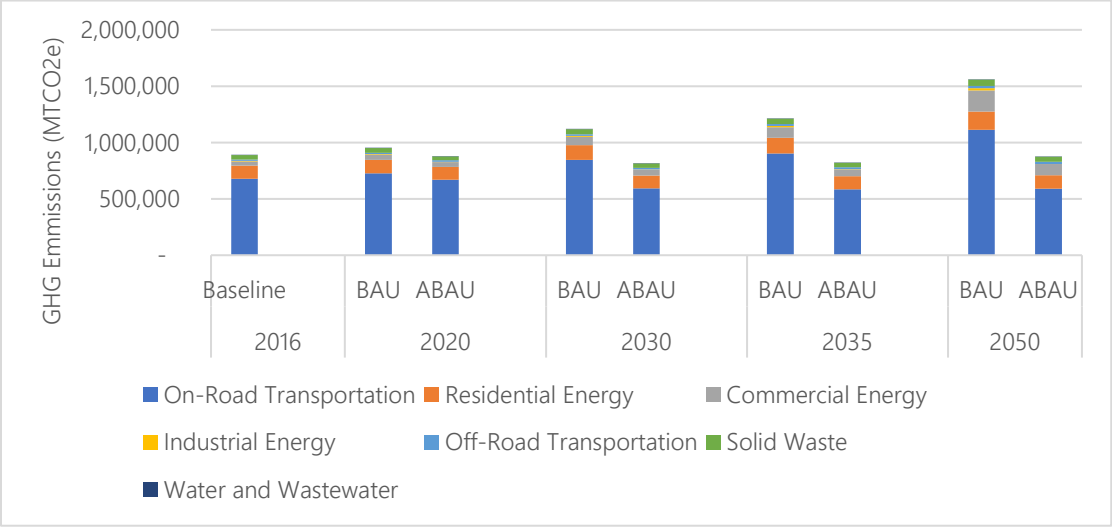
Emissions Sector	2016	2020		2030		2035		2050	
		BAU	ABAU	BAU	ABAU	BAU	ABAU	BAU	ABAU
On-Road Transportation	679,920	727,135	669,154	845,173	592,254	904,192	585,860	1,113,648	591,645
Off-Road Transportation	11,741	12,580	12,580	15,237	15,237	16,755	16,755	19,781	19,781
Residential Energy	114,112	118,854	114,180	132,290	113,865	139,230	114,775	161,409	116,927
Commercial Energy	38,310	46,175	42,071	73,645	51,518	93,006	59,829	187,331	101,023
Industrial Energy	4,179	5,037	4,274	8,033	3,389	10,145	3,004	20,434	266
Solid Waste	40,038	41,778	34,182	45,834	37,501	48,102	39,356	55,601	45,491
Water and Wastewater	2,275	2,008	1,916	2,063	1,410	2,108	1,208	2,239	456
Total	**890,575**	**953,569**	**878,357**	**1,122,275**	**815,174**	**1,213,537**	**820,787**	**1,560,442**	**875,589**
Percent change from 2016 (%)	-	7%	-1%	26%	-8%	36%	-8%	75%	-2%

Notes: Columns may not add to totals due to rounding.

BAU = business as usual; GHG = greenhouse gas emissions; $MTCO_2e$ = metric tons of carbon dioxide equivalent

Source: Ascent Environmental 2019

A comparison of emission trends that would occur without anticipated legislative reductions (BAU) and with anticipated legislative reductions (ABAU) is presented in **Figure 2-1**. As shown in **Table 2-4** and **Figure 2-2**, from years 2016 to 2020 the City's ABAU emissions would decrease by one percent rather than increase by seven percent under a BAU scenario. This one percent reduction is the result of the application of legislative reductions provided in **Table 1-1** and a renewable energy mix in the electricity supply of 33 percent by 2020. Similarly, legislative reductions including a renewable energy mix of 60 percent applied to years 2030 to 2035 allows a seven percent reduction rather than a 27 percent increase. Although most legislative actions are not known at this time for years 2030 to 2050, SB 100 requires California to receive 100 percent of its electricity from renewable and zero-carbon sources. Furthermore, vehicle fuel economies are forecasted to improve along with increased electric vehicle (EV) adoption. Further details on the legislation details applied to the BAU emissions can be found in **Appendix A**.



Notes: BAU = Business-As-Usual; ABAU = Legislative-Adujsted Business-As-Usual; GHG = greenhouse gas; $MTCO_2e$= annual metric tons of carbon dioxide equivalent.

Figure 2-2 Business-As-Usual and Legislative-Adjusted Business-As-Usual Emissions Forecasts Comparison

2.3 Reductions Targets

As directed by AB 32, SB 32, and Executive Orders B-30-15 and S-3-05, the State aims to reduce statewide GHG emissions to:

- 1990 levels by 2020,
- 40 percent below 1990 levels by 2030, and
- 80 percent below 1990 levels by 2050.

Because the necessary data are not available to estimate the City's 1990 emission levels, proportional targets for the CAP Update were developed that express the level of GHG emissions reductions that would be needed locally between 2016 and future target years to demonstrate consistency with statewide targets. To determine an equivalent reduction target at the local level, CARB's 2017 Scoping Plan recommends community-wide GHG reduction goals for local CAPs that will help the State achieve its 2030 target and longer-term 2050 goal. CARB recommends that local governments evaluate and adopt robust and quantitative locally-appropriate goals that align with the statewide per capita targets and the State's sustainable development objectives to develop plans to achieve local goals (CARB 2017). These State goals consist of reducing emissions to six (6) $MTCO_2e$ per capita and two (2) $MTCO_2e$ per capita by 2030 and 2050, respectively.

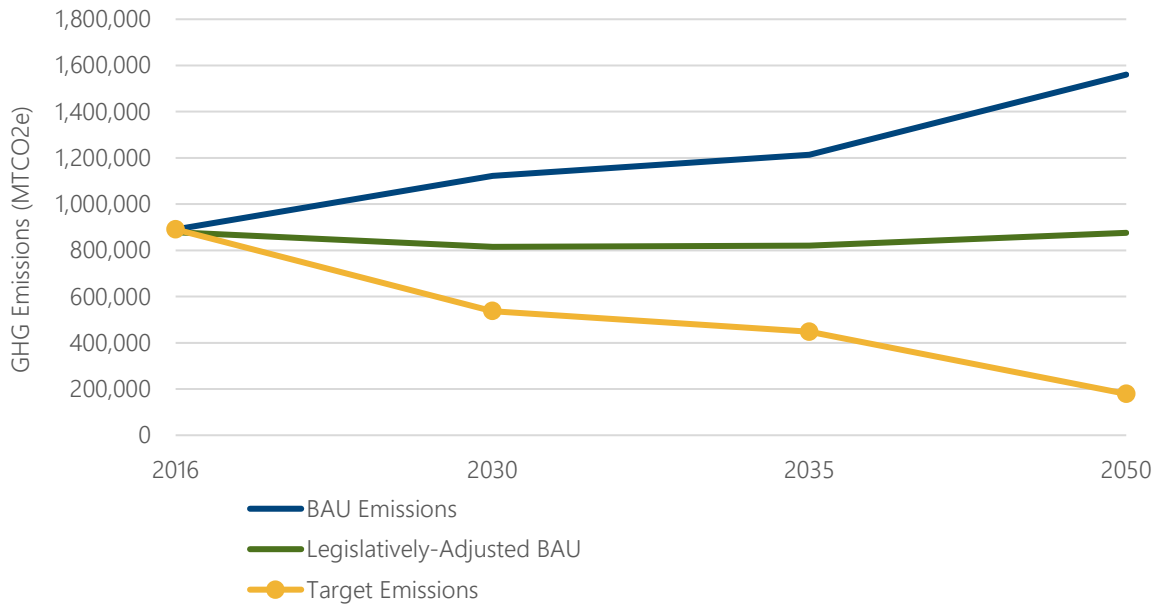
Because the statewide per capita targets are based on the statewide GHG emissions inventory that includes all emissions sectors in the state (and not all emissions sectors apply to all jurisdictions), CARB also states that it is appropriate for local jurisdictions to derive evidence-based local per capita goals on local emissions sectors and population forecasts that are consistent with the framework used to develop the statewide targets. The 2017 Scoping Plan clarifies that an evidence-based local per capita goal, or some other metric that the local jurisdiction deems appropriate (e.g., mass emission, per service population), may be used (CARB 2017). With the Scoping Plan recommendations in mind, reduction targets were derived using a mass emissions approach.

Statewide per capita targets are based on the statewide mass reduction targets (i.e., 40 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050). As indicated in the *CAP Update Tech Memo, GHG Inventory, Forecasts, and Targets* in Appendix A, CARB's statewide inventories show emissions from all sectors were approximately 431 million $MTCO_2e$ ($MMTCO_2e$) in 1990 and 429 $MMTCO_2e$ in 2016 (CARB 2018). Thus, 2016 statewide emissions were 2 $MMTCO_2e$ (0.37 percent) less than the 1990 level and the State's 2020 GHG target. Consequently, no further reductions from 2016 emissions levels are needed to achieve the 2020 target of returning emissions to 1990 levels. Because 2016 emissions are essentially equal to the 1990 emissions level based on CARB data, reduction percentages from 2016 levels needed to meet the State's 2030 and 2050 goals are equivalent to the reductions percentages when measured against 1990 levels: 40 percent by 2030 and 80 percent by 2050. A 2035 target was established based on interpolation of the 2030 and 2050 target and goal. Thus, consistent with CARB's recommendations for communitywide targets, the following adjusted reduction targets should be achieved in the City to meet statewide GHG reduction goals:

- 40 percent below 2016 levels by 2030,
- 50 percent below 2016 levels by 2035, and
- 80 percent below 2016 levels by 2050.

2.4 Local Emissions Gap

As discussed previously and shown in **Figure 2-3**, based on the current demographic trends and legislative actions, the City would meet its 2020 target without any additional local actions to reduce GHG emissions.



Notes: BAU = Business-As-Usual; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent
Source: Ascent Environmental 2019.

Figure 2-3 Legislative-Adjusted Business-As-Usual Forecast Emissions and Recommended Emission Reduction Targets

State and federal legislative actions, however, would not be adequate to achieve the City's 2030, 2035, and 2050 GHG reduction goals. While these legislative actions would assist in achieving this goal, the City would need to implement additional local actions to achieve further reductions. This additional reduction required at the local level to meet the reduction targets for each year is referred to as the "local gap." To close the local gap and meet the City's targets, GHG emissions would need to be reduced to 536,836 $MTCO_2e$ by 2030, 447,363 $MTCO_2e$ by 2035, and 178,945 $MTCO_2e$ by 2050.

This CAP Update primarily focuses on reducing emissions by 2030 and 2035 consistent with State targets, and also establishes a 2050 goal, which is important to guide long-term planning. However, achieving a 2050 goal in a local government CAP is considerably challenging due to the extended time horizon, uncertainty about the future and the City's limited jurisdiction over several sources of emissions. Furthermore, the State's 2017 Scoping Plan does not demonstrate a feasible pathway for the State to achieve its 2050 goal at this time. It is technically possible to calculate the scale of emissions reductions at a local level to achieve a 2050 goal, but it is not feasible or meaningful to analyze how a local government can substantially achieve a 2050 goal based on local actions alone, as it is difficult to establish defensible reduction assumptions beyond a 15-year time frame. This is primarily because of uncertainty around future technological advances and future changes in State and federal law and a local government's relatively limited jurisdiction over several emissions sources and activities that affect emissions.

In the coming decades, new innovations and technologies could become available that will enable further GHG reductions beyond 2035 on the path to achieving the long-term 2050 goal. New or more reliable methods may also become available to quantify measures that are currently unquantifiable. Finally, future laws or regulations may further reduce emissions in sectors currently outside of the jurisdiction of the City (e.g., new vehicle emissions standards that would apply to new or replacement vehicles decades into the future), or emissions in sectors currently addressed primarily by local measures. As climate change science and policy continues to change, the City will be able to reevaluate how these and other factors are affecting progress toward meeting the long-term 2050 GHG emissions reduction goal in future CAP updates (as outlined in **Chapter 4**)

A detailed description of the calculations and estimates for these emissions and targets is provided in Appendix A.

3 GREENHOUSE GAS REDUCTION MEASURES

This chapter outlines the greenhouse gas (GHG) reduction measures that the City will implement to achieve its reduction targets. Accounting for legislative actions taken by the federal and State governments, this Climate Action Plan Update (CAP Update) focuses on locally-based measures the City can implement to reduce GHG emissions across various emissions categories.

The local measures to reduce emissions fall under five emissions categories: transportation, building energy, land use, solid waste, and water and wastewater. These actions and measures mainly focus on community-scale reductions, but also include municipal operations. Through partnerships with and among the community, businesses, and other organizations, these measures could provide co-benefits, such as an improved environment, cost savings, conserved resources, public health benefits and greater quality of life.

As described in **Section 1.3** of the CAP Update, the existing strategies and measures of the 2011 CAP were used to inform development of measures for the CAP Update and in some cases have been expanded upon in order to meet the targets for 2030 and 2035.

3.1 Summary of Greenhouse Gas Reduction Measures

Chapter 2 of the CAP Update describes the City's GHG reduction targets for years 2030 and 2035, and a reduction goal for 2050 to be consistent with State goals. The 2030 target would require a 40 percent reduction from 2016 levels (reduction to 536,836 metric tons of carbon dioxide equivalent [$MTCO_2e$]), 2035 would require a 50 percent reduction from 2016 levels (reduction to 447,363 $MTCO_2e$), and 2050 would require an 80 percent reduction from 2016 levels (reduction to 178,945 $MTCO_2e$).

Under business-as-usual (BAU) GHG emissions forecast, the City is estimated to generate 1,122,275 $MTCO_2e$ in 2030, which would be 585,439 $MTCO_2e$ more than the 2030 reduction target. Thus, continuing under a BAU scenario, the City would not meet its 2030, 2035, and 2050 targets. Under the legislative-adjusted BAU scenario (ABAU), the 2030 target is exceeded by 278,338 $MTCO_2e$ and the 2035 target is exceeded by 373,423 $MTCO_2e$, requiring addition local action by the City to meet its reduction target. This CAP Update provides local measures to close the gap and meet the City's reduction targets for 2030 and 2035.

Table 3-1 shows the GHG reductions attributable to the measures in this CAP Update and how anticipated reductions will help the City close the gap in emissions to meet its 2030 and 2035 targets. It also shows the City's progress in achieving its fair-share of emissions reductions toward the State's 2050 goal. Detailed calculations for each measure are provided in **Appendix B**.

Table 3-1 Effect of Plan Measures and Legislative Reductions on City of Murrieta Emissions and Targets ($MTCO_2e$)

Emissions	2030	2035	2050
BAU Emissions Forecasts	**1,122,275**	**1,213,537**	**1,560,442**
Federal and State Legislative Reductions	307,102	392,750	684,853
ABAU Emissions Forecast (BAU Forecasts – Federal and State Legislative Reductions)	**815,174**	**820,787**	**875,589**
Target Emissions	**536,836**	**447,363**	**178,945**
Reductions from CAP Transportation Measures	154,396	204,673	285,324
Reductions from CAP Energy Measures	86,656	123,143	193,059
Reductions from CAP Land Use Measures	32,769	41,614	52,258
Reductions from CAP Solid Waste Measures	5,582	8,043	11,806

Table 3-1 Effect of Plan Measures and Legislative Reductions on City of Murrieta Emissions and Targets ($MTCO_2e$)

Emissions	2030	2035	2050
Reductions from CAP Water and Wastewater Measures	61	48	0
Total Reductions from CAP Measures	**279,463**	**377,521**	**542,447**
City of Murrieta Emissions with CAP (ABAU – CAP Reductions)	**535,711**	**443,266**	**333,142**
Percentage of gap achieved through CAP Measures	100%	101%	78%

BAU = business-as-usual; ABAU = legislative-adjusted business-as-usual; CAP = Climate Action Plan; GHG = greenhouse gas emissions; $MTCO_2e$ = metric tons of carbon dioxide equivalent

Source: Ascent Environmental, Inc. 2019

The table shows that in 2030 the largest amount of reductions would come from transportation measures, followed by measures addressing building energy, land use, solid waste, and water and wastewater. For years 2035 and 2050, the largest amount of reductions would come from transportation measures, with building energy and the remaining measures to follow.

3.2 Detailed Greenhouse Reduction Measures

To close the gap between the City's anticipated ABAU emissions and its reduction targets for 2030 and 2035, this CAP Update proposes 20 GHG reduction measures organized under five GHG emissions categories. These measures were developed based on a combination of factors, including:

- The reduction measures included in the City's 2011 CAP;
- Recommended measures identified by the Western Riverside Council of Governments (WRCOG) in its subregional CAP;
- The need for greater reductions in the sectors with the most emissions, especially in building energy and transportation;
- Other existing programs, policies, activities, or projects that can be expanded upon, or proposed policies yet to be adopted;
- Technological innovations;
- The City's jurisdiction and influence over activities that directly or indirectly generate GHG emissions; and
- The potential feasibility of the measure.

Each measure is described in detail in this chapter, including the full description of each measure, assumptions for what implementation of each measure will achieve (in 2030, 2035, and 2050), and estimated GHG emissions reduction potential associated with implementation of each measure (in 2030, 2035, and 2050). Measures, implementation assumptions, and GHG reduction potential are defined in **Table 3-2**. Additional GHG reduction calculation details are included in **Appendix B**.

Chapter 4 further describes how the City will implement each of the 20 GHG reduction measures and monitor their effectiveness over time. In addition, **Section 4.2.3**, "Implementation Descriptions for Key Measures," provides additional discussion of how the following nine key GHG reduction measures could be implemented:

- T-1 and T-2 Electric Vehicle (EV) Programs,
- T-7 Transportation Demand Management Program,
- T-9 GHG Mitigation Fee Program for New Development,
- BE-1 Community Renewable Energy,
- BE-2 Municipal Renewable Energy,
- BE-3 Zero Net Energy Standard,

- BE-4 Energy Efficiency and Electrification Program, and
- LU-1 Jobs-Housing Balance Strategy.

Table 3-2 Greenhouse Gas Reduction Measure Details

Category	Description
Measure	Programs, policies, or projects the City will implement that will cause a direct and measurable reduction in GHG emissions.
Implementation Assumption	Metric by which achievement of the specified measure will be determined in 2030, 2035, and 2050.
GHG Reduction Potential in 2030, 2035, and 2050	Estimated reduction in local GHG emissions if the performance metric is met. The years 2030, 2035, and 2050, correspond to the emissions target set by the City (and in line with State mandates).

Notes: CAP = Climate Action Plan; City = City of Murrieta; GHG = greenhouse gas

Source: Ascent Environmental, Inc. 2019.

3.2.1 Transportation

Transportation Measures Co-Benefits:
- Cost savings
- Air quality improvements
- Economic benefits
- Improved City infrastructure
- Mobility and roadway safety
- Public health benefits

Emissions from on- and off-road transportation are the largest contributor to the City's total GHG emissions at 77 percent. On-road vehicles contribute approximately 76 percent of emissions, while off-road vehicles contribute approximately one percent of emissions. On- and off-road emissions are dependent upon vehicle types. On-road emissions typically occur from the operation of passenger vehicles, while off-road emissions account for the use of construction equipment, recreational vehicles, and residential and commercial equipment. Legislative reductions, mainly from improvements in State and federal vehicle fuel efficiency and GHG standards, will contribute to reductions in transportation emissions. At the local level, the State relies on local and regional agencies to implement measures that affect the frequency or distance of vehicle travel or reduce the use of internal combustion vehicles by shifting to alternative modes of transportation. These measures include increasing zero-emission or alternative fuel vehicle use, increasing transportation system efficiency for existing and future travel patterns, and increasing the use of alternative travel modes including bicycling, walking, and transit. Table 3-3 provides GHG reduction measures for the transportation sector, including implementation assumptions and GHG reduction potential in 2030, 2035, and 2050.

Table 3-3 Transportation

T-1: Electric Vehicle Incentives and Promotion

Measure:
Increase EV and alternative fuel vehicles to 21.5% of the City's vehicle mix by 2030 and 23% by 2035 by incentivizing EV purchases and promoting EV ownership for residents and businesses.[1]

Implementation Assumption:
This measure assumes that through the City's efforts to incentivize EV adoption among residents, the percentage of EV and Zero Emissions Vehicles (ZEVs) increases in the City to above levels that are already forecasted to occur due to State and federal vehicle standards under an ABAU scenario.

GHG Reduction Potential in 2030 ($MTCO_2e$)	GHG Reduction Potential in 2035 ($MTCO_2e$)	GHG Reduction Potential in 2050 ($MTCO_2e$)
86,188	87,335	120,574

Table 3-3 Transportation

T-2: Electric Vehicle Charging Ordinance

Measure:
Adopt an (EV) charging station ordinance that requires the following for new development[1]:

- Installation of one EV charger per single-family housing unit; and
- EV charger infrastructure installation at six percent of total parking spaces for new multi-family projects
- EV charger installation at three percent of total parking spaces for new nonresidential projects

Implementation Assumption:
This measure assumes that the City will adopt an ordinance that requires new development to have a certain level of EV infrastructure in place as part of the project. The reductions achieved from this measure are combined with T-1.

GHG Reduction Potential in 2030 ($MTCO_2e$)	GHG Reduction Potential in 2035 ($MTCO_2e$)	GHG Reduction Potential in 2050 ($MTCO_2e$)
See T-1	See T-1	See T-1

T-3: TOD Affordable Housing Program

Measure:
Prioritize mixed-use and transit-oriented affordable housing projects to achieve the City's affordable housing targets in the SCAG Regional Housing Needs Assessment.

Implementation Assumption:
This measure assumes that the City would focus on developing mixed-use, transit-oriented affordable housing projects in the future. The measure further assumes that these projects would be located in areas that encourage trips made by walking, biking, and transit, and keeps pace with City's RHNA and Housing Element goals for affordable housing units in the City.

GHG Reduction Potential in 2030 ($MTCO_2e$)	GHG Reduction Potential in 2035 ($MTCO_2e$)	GHG Reduction Potential in 2050 ($MTCO_2e$)
5,036	5,572	7,670

T-4: Murrieta Bike Network

Measure:
Increase the City's bike and pedestrian infrastructure, including implementing the Downtown Murrieta Bike Network, developing comprehensive bike parking standards, and increasing the total percentage of City streets that include bike lanes throughout the City.

Implementation Assumption:
This measure assumes that the City continues to develop the City's bike network, and the percentage of streets in Murrieta with bike lanes continues to increase over time.

GHG Reduction Potential in 2030 ($MTCO_2e$)	GHG Reduction Potential in 2035 ($MTCO_2e$)	GHG Reduction Potential in 2050 ($MTCO_2e$)
367	120	0

T-5: Traffic Signal Synchronization

Measure:
Improve traffic flow and reduce traffic congestion by implementing a comprehensive traffic signal synchronization and update.

Implementation Assumption:
This measure assumes that the City would conduct a comprehensive upgrade of the traffic signal system to improve traffic flow and relieve traffic congestion, particularly during commute congestion periods. This measure assumes that fuel consumption associated with commute-related VMT in the City will decrease by 9% as a result of improving traffic signal synchronization.

GHG Reduction Potential in 2030 ($MTCO_2e$)	GHG Reduction Potential in 2035 ($MTCO_2e$)	GHG Reduction Potential in 2050 ($MTCO_2e$)
1,213	1,265	1,500

Table 3-3 Transportation

T-6: Traffic Calming Program

Measure:
Implement a traffic calming measure program to increase the percentage of City streets and intersections with traffic calming measures.

Implementation Assumption:
This measure assumes that the City would continue to implement traffic calming measures on City streets and intersections to reduce traffic speeds and reduce cut-through traffic. The measure further assumes that a certain percentage of streets and intersections will include traffic calming measures by each milestone year.

GHG Reduction Potential in 2030 ($MTCO_2e$)	GHG Reduction Potential in 2035 ($MTCO_2e$)	GHG Reduction Potential in 2050 ($MTCO_2e$)
890	929	3,306

T-7: Transportation Demand Management Program

Measure:
Implement a Citywide TDM Program to reduce communitywide VMT[1]

1. Update Development Code to require employers with 50 or more employees to implement commute trip reduction programs.

   Commute Trip Reduction Programs voluntary for employees include:
   - Alternative modes of commuting incentive program (e.g., walking, biking, etc.);
   - Ride-sharing and preferential parking;
   - Discounted transit fee program; or
   - Telecommuting or alternative work schedules
2. Implement a comprehensive ridesharing program targeted at residents working in neighboring cities and long-distance commuters (e.g., San Diego, Los Angeles).
3. Monitor progress annually on TDM program to measure progress towards achieving a nine percent reduction in VMT by 2030 and an 11 percent reduction by 2035.

Implementation Assumption:
This measure assumes that the City would implement a comprehensive TDM program that requires new large employers to offer TDM options and incentives to employees as well as providing commute services and support (e.g., rideshare, telework) for residents who work outside the City. The measure assumes a certain percentage of commute-related VMT reduction by each target year.

GHG Reduction Potential in 2030 ($MTCO_2e$)	GHG Reduction Potential in 2035 ($MTCO_2e$)	GHG Reduction Potential in 2050 ($MTCO_2e$)
8,954	11,416	18,373

T-8: Transit Network

Measure:
Work with RTA and WRCOG to expand the transit network in the City and increase service frequency with a priority on expanding services to neighboring cities where Murrieta residents work.

Implementation Assumption:
This measure assumes that the City would work with RTA and other regional partners to expand the transit network in the City and increase the frequency of service of existing transit services.

GHG Reduction Potential in 2030 ($MTCO_2e$)	GHG Reduction Potential in 2035 ($MTCO_2e$)	GHG Reduction Potential in 2050 ($MTCO_2e$)
10,391	21,555	25,145

Table 3-3 Transportation

T-9: GHG Reduction Program

Measure:

Develop and implement a no-net-increase in GHG emissions threshold for new development projects in the City and develop a GHG Fee Program to offset remaining GHG emissions from new development that cannot be achieved through project design features or other GHG reduction measures included in the CAP Update. As part of implementation of this measure, the City shall[1]:

- Adopt a set of strategies to reduce GHG emissions from new development through project-specific mitigation measures.
- Develop a process in which the remainder of emissions that cannot be reduced through project-specific measures shall be quantified and offset through a combination of a local emissions offset program to be set up by the City and other offset registry programs.

Implementation Assumption:

This measure assumes the City develops a program to reduce and offset GHG emissions associated with new development projects. The measure assumes emissions reductions and offsets can be tracked and quantified to ensure compliance with the measure.

GHG Reduction Potential in 2030 ($MTCO_2e$)	GHG Reduction Potential in 2035 ($MTCO_2e$)	GHG Reduction Potential in 2050 ($MTCO_2e$)
41,357	76,481	108,756

Notes: City = City of Murrieta; GHG = greenhouse gas; MTCO2e = metric tons of carbon dioxide equivalent; EV = electric vehicle; SCAG = Southern California Association of Governments; RTA = Riverside Transit Agency; WRCOG = Western Riverside Council of Governments

[1] Refer to Section 4.2.3 Implementation Descriptions for Key Measures, for additional discussion of how this measure could be implemented

Source: Ascent Environmental, Inc. 2019.

3.2.2 Building Energy

Energy consumption in the City includes electricity and natural gas use, which accounted for 18 percent of the City's total emissions in 2016. The City's building energy sector accounts for consumption from residential, commercial, and industrial energy users. The success of building energy emission reduction measures depends on coordination with local utilities and organizations; participation from community members, and implementation of new or revised local policies and programs. Table 3-4 provides GHG reduction measures for the building energy sector, including implementation assumptions and GHG reduction potential in 2030, 2035, and 2050.

Building Energy Measures Co-Benefits:
- Cost savings
- Air quality improvements
- Economic benefits
- Improved City infrastructure

Table 3-4 Building Energy

BE-1: Community Renewable Energy

Measure:
The City shall create or join a Community Choice Aggregation (CCA) program such as Western Community Energy or create a partnership with SoCal Edison's off-site renewable energy programs (i.e., Green Rate Program), which allows building renters and owners to opt into cleaner electricity sources.[1]

Implementation Assumption:
This measure assumes that the City of Murrieta joins Western Community Energy or forms a partnership with SCE such as the Green Rate Program. Based on estimates from the CCA feasibility study conducted for Western Community Energy, the measure assumes that 95% of existing and new residential customers opt-in to the CCA and 90% of existing and new nonresidential users opt-in to the CCA. The measure assumes that customers that do opt-in choose the 100% renewable energy option. Based on other CCAs in California, this is a conservative opt-in rate.

GHG Reduction Potential in 2030 ($MTCO_2e$)	GHG Reduction Potential in 2035 ($MTCO_2e$)	GHG Reduction Potential in 2050 ($MTCO_2e$)
28,306	22,210	0

BE-2: Municipal Renewable Energy

Measure:
Develop renewable energy generation systems on City-owned property for use in municipal operations.

Implementation Assumption:
The measure assumes that the City develops photovoltaic systems on City buildings and property over the next ten years and beyond. The measure assumes that the City offsets 100% of its GHG emissions associated with electricity by 2035 through a combination of on-site solar systems and participation in the CCA.[1]

GHG Reduction Potential in 2030 ($MTCO_2e$)	GHG Reduction Potential in 2035 ($MTCO_2e$)	GHG Reduction Potential in 2050 ($MTCO_2e$)
26	39	0

BE-3: Zero Net Energy Standards

Measure:
Adopt a Zero Net Energy standards for development by 2025 and implement it through the following phased approach:
- Begin phase-in of standards in 2025 by applying, where feasible, to residential, commercial, and industrial projects
- Full phase-in of standards for residential and commercial uses by 2030, requiring all new residential and commercial projects to comply
- Full phase-in of standards for industrial uses by 2035, requiring all new industrial uses to comply

Implementation Assumption:
This measure assumes that the City adopts a Zero Net Energy standard for development by 2025. The measure assumes that it would be feasible for 75% of residential units and 65% of commercial square footage developed between 2020 and 2030 to comply with the ZNE standard. The measure assumes that it would be feasible for 100% of residential units and 100% of commercial projects to comply with the ZNE standard by 2030, feasible for 50% of industrial projects developed between 2025 and 2035 to comply, and feasible for 100% of industrial projects to comply by 2035.[1]

Table 3-4 Building Energy

GHG Reduction Potential in 2030 ($MTCO_2e$)	GHG Reduction Potential in 2035 ($MTCO_2e$)	GHG Reduction Potential in 2050 ($MTCO_2e$)
24,659	50,094	113,303

BE-4: Energy Efficiency and Electrification Program

Measure:

Work with WRCOG's Western Riverside Energy Partnership to develop and implement a comprehensive electrification and energy efficiency retrofit program focused on reduction of natural gas use in existing residential and commercial land uses. The program would include the goal of reducing natural gas in existing residential and nonresidential land uses by 20% by 2030. [1]

- The program would include, but not be limited to, strategies focused on:
  - Pool-related energy use (e.g., pool cover rebate program)
  - Electrification retrofits for natural gas appliances in existing residential and commercial land uses (i.e., hot water heaters, cooktops, heating systems)

Implementation Assumption:

This measure assumes that the City will develop and implement a comprehensive energy efficiency retrofit and appliance electrification program, focused on reducing natural gas use in existing land uses through appliance upgrades, weatherization upgrades, and other energy efficiency measures.

GHG Reduction Potential in 2030 ($MTCO_2e$)	GHG Reduction Potential in 2035 ($MTCO_2e$)	GHG Reduction Potential in 2050 ($MTCO_2e$)
33,664	50,800	79,757

Notes: City = City of Murrieta; GHG = greenhouse gas; WRCOG = Western Riverside Council of Governments; $MTCO_2e$ = metric tons of carbon dioxide equivalent

[1] Refer to Section 4.2.3 Implementation Descriptions for Key Measures, for additional discussion of how this measure could be implemented

Source: Ascent Environmental, Inc. 2019.

3.2.3 Land Use

Land use types and patterns inherently affect GHG emissions in the City by influencing people's travel behaviors and the sequestration of carbon. Land use patterns provide an overarching influence on all inventoried sectors. Through the implementation of land use measures with keeping the goal of reducing GHG emissions in mind, they can play a fundamental role in how cities operate, while at the same time support the reduction of carbon stored in the atmosphere. **Table 3-5** provides GHG reduction measures for the land use sector, including implementation assumptions and GHG reduction potential in 2030, 2035, and 2050.

Land Use Measures Co-Benefits:
- Cost savings
- Air quality improvement
- Economic benefits
- Improved City infrastructure
- Improved quality of life

Table 3-5 Land Use

LU-1: Jobs-Housing Balance Strategy

Measure:
Encourage flexibility in land use regulations to respond to requirements of new and emerging business and industry types and help create a sustainable jobs-housing balance.[1]

Implementation Assumption:
This measure assumes the number of jobs within the City and within a 30-mile radius of the City would increase in the future and would result in commute-related VMT reductions for residents.

GHG Reduction Potential in 2030 ($MTCO_2e$)	GHG Reduction Potential in 2035 ($MTCO_2e$)	GHG Reduction Potential in 2050 ($MTCO_2e$)
10,373	10,418	12,261

LU -2: Tree Planting Program

Measure:
Develop a tree planting program to plant trees throughout the City to increase carbon sequestration.

Implementation Assumption:
This measure assumes the City would develop a program to plant trees for carbon sequestration and other co-benefits, planting an average number of trees per year.

GHG Reduction Potential in 2030 ($MTCO_2e$)	GHG Reduction Potential in 2035 ($MTCO_2e$)	GHG Reduction Potential in 2050 ($MTCO_2e$)
6,301	12,956	19,612

LU -3: Open Space Conservation

Measure:
Work with the Western Riverside Regional Conservation Authority (RCA) and the Center for Natural Lands Management to implement land use conservation programs for the City. The program would include a minimum acreage of land preserved through conservation easements and, therefore, would not be permitted for future development.

Implementation Assumption:
This measure assumes that a certain number of acres in the City limits would be preserved as open space resulting in carbon sequestration. The measure assumes that this land would otherwise be cleared for development and, if nor preserved, would result in a net decrease in sequestration potential.

GHG Reduction Potential in 2030 ($MTCO_2e$)	GHG Reduction Potential in 2035 ($MTCO_2e$)	GHG Reduction Potential in 2050 ($MTCO_2e$)
16,095	18,240	20,385

Notes: City = City of Murrieta; GHG = greenhouse gas; MTCO2e = metric tons of carbon dioxide equivalent

[1] Refer to Section 4.2.3 Implementation Descriptions for Key Measures, for additional discussion of measure implementation.

Source: Ascent Environmental, Inc. 2019.

3.2.4 Solid Waste

Solid waste emissions generated in the City are produced from the transport of solid waste and the off-gassing of waste disposed into landfills. Solid waste accounts for an estimated four percent of communitywide emissions in the city in 2016. Reducing waste in the City is important to preserve resources while also creating renewable sources that may help contribute to emission reductions in other sectors. **Table 3-6** provides GHG reduction measures for the solid waste sector, including implementation assumptions and GHG reduction potential in 2030, 2035, and 2050.

Solid Waste Measures Co-Benefits:
- Improved City infrastructure
- Air quality improvement
- Cost savings

Table 3-6 Solid Waste

SW-1: Waste Diversion Program

Measure:
Encourage recycling or reuse of materials to reduce the amount of solid waste generated within the City with the goal of achieving an 85% waste diversion rate by 2030 and 90% waste diversion rate by 2035.

Implementation Assumption:
This measure assumes that the City would work to exceed the State's 75% waste diversion target by achieving an 85% waste diversion rate by 2030 and 90% waste diversion rate by 2035.

GHG Reduction Potential in 2030 ($MTCO_2e$)	GHG Reduction Potential in 2035 ($MTCO_2e$)	GHG Reduction Potential in 2050 ($MTCO_2e$)
4,583	7,215	11,120

SW-2: Construction Waste Diversion

Measure:
Require all construction projects to exceed CALGreen construction waste diversion requirements by 15 percent.

Implementation Assumption:
This measure assumes that the City would implement a policy, as part of the City's CAP Consistency checklist or other development review process, to require all construction projects to exceed CALGreen's 65 percent construction waste diversion requirements by 15 percent.

GHG Reduction Potential in 2030 ($MTCO_2e$)	GHG Reduction Potential in 2035 ($MTCO_2e$)	GHG Reduction Potential in 2050 ($MTCO_2e$)
998	827	686

Notes: City = City of Murrieta; GHG = greenhouse gas; MTCO2e = metric tons of carbon dioxide equivalent

Source: Ascent Environmental, Inc. 2019.

3.2.5 Water and Wastewater

GHG emissions are produced through the energy used to pump, transport, and treat water and wastewater. The handling of water and wastewater accounted for less than one percent of the City's total emissions in 2016. Though reductions achieved through wastewater and water measures are minimal compared to other measures, they are needed to address serious impacts of climate change by reducing water consumption, recycling wastewater, and changing behavioral patterns of water consumption. Beyond providing emissions reductions, these measures provide the City with sustainable practices that will allow it to better adapt to the changing climate. **Table 3-7** provides GHG reduction measures for the water and wastewater sector, including implementation assumptions and GHG reduction potential in 2030, 2035, and 2050.

Water and Wastewater Measures Co-Benefits:

- Cost savings
- Economic benefits
- Improved City infrastructure

Table 3-7 Water and Wastewater

WW-1: Landscaping and Water Conservation Program

Measure:
Reduce outdoor water use by 10% at residential, commercial, and public properties by installing efficient irrigation systems and plants with lower watering needs.

Implementation Assumption:
This measure assumes that City would implement a policy to reduce outdoor water use from various land uses by installing efficient irrigation systems, using plants with lower watering needs, and promoting water conservation. The measure assumes that Citywide water use is reduced by a certain percent by the target years.

GHG Reduction Potential in 2030 ($MTCO_2e$)	GHG Reduction Potential in 2035 ($MTCO_2e$)	GHG Reduction Potential in 2050 ($MTCO_2e$)
55	44	0

WW-2: Rainwater Catchment and Greywater Systems Program

Measure:
Encourage property owners to recycle water with rainwater catchment and greywater systems in existing and new developments.

Implementation Assumption:
This measure assumes that the City would develop and implement a program to increase recycled water use by residents through the use of rainwater catchment and greywater systems in existing and new developments.

GHG Reduction Potential in 2030 ($MTCO_2e$)	GHG Reduction Potential in 2035 ($MTCO_2e$)	GHG Reduction Potential in 2050 ($MTCO_2e$)
5	4	0

Notes: City = City of Murrieta; GHG = greenhouse gas; MTCO2e = metric tons of carbon dioxide equivalent

Source: Ascent Environmental, Inc. 2019.

4 IMPLEMENTATION AND MONITORING

This chapter outlines how the City will implement and monitor the Climate Action Plan Update (CAP Update) measures over time to reduce greenhouse gases (GHGs). To achieve the GHG emissions reductions described in Chapter 3, measures should be continuously assessed and monitored to ensure that: (1) the measures are effective; (2) the City is on track to achieve the GHG reduction targets; and (3) desired community outcomes are attained.

4.1 Implementation Strategy

Implementation of the reduction measures identified in **Chapter 3** will require ongoing management, oversight, and staffing. Ensuring that the measures translate to on-the-ground results and reductions in GHG emissions is critical to the success of the CAP Update. Most importantly, the City's CAP Update and GHG emissions reduction measures will depend on the participation of the City's residents, businesses, and stakeholders.

> The City will continue to monitor and update measures to ensure they can be successfully implemented.

Figure 4-1 provides an overview of the considerations involved in the process of implementing GHG reduction measures including identification of administration and staffing needs, securing adequate financing and budget, determining actual method(s) of implementation, monitoring the effectiveness of implementation and reporting its results, and involving the public in the process. To continue successful implementation of the CAP Update measures, the City will further expand on this initial examination once implementation has begun.

Figure 4-1 Implementation Process

4.1.1 The Role of New Development

Implementation of the CAP Update will require that new development projects attain higher levels of energy efficiency and incorporate more sustainable design standards. New developments that are consistent with applicable GHG reduction measures in a CAP Update are eligible for CEQA streamlining, per the provisions of State CEQA Guidelines Section 15183.5. Under these provisions, if a project can show consistency with applicable GHG reduction measures in a CAP, the level of analysis for the project required under CEQA with respect to GHG emissions can be reduced considerably. Furthermore, a project's incremental contribution to cumulative GHG emissions may be determined not to be cumulatively considerable. This CAP Update meets the criteria identified in Section 15183.5 and is therefore considered a "qualified" CAP and may be used for the specific purpose of streamlining the analysis of GHG emissions for subsequent projects. The CAP Update provides environmental review streamlining benefits for development projects proposed in the city provided they demonstrate consistency with this CAP Update.

A project's consistency with the CAP will be determined through the CAP Consistency Review Checklist (Checklist). The Checklist contains GHG reduction measures applicable to development projects that are required to be implemented on a project-by-project basis to ensure that the specific emission targets identified in the CAP

are achieved. New development projects will need to incorporate all potential applicable CAP measures to demonstrate consistency with the CAP. The Checklist is provided in **Appendix C** of the CAP Update.

The Checklist may also be updated to incorporate new GHG reduction techniques or to comply with later amendments to the CAP or local, State, or federal law or regulation. By incorporating applicable GHG reduction measures in the Checklist into project designs or conditions of approval, the City will ensure that new development is consistent with applicable GHG reduction measures in the CAP and thus will contribute its "fair share" in achieving the identified GHG reduction targets.

The CAP is a plan for the reduction of GHG emissions in accordance with CEQA Guidelines Section 15183.5. Pursuant to CEQA Guidelines Sections 15064(h)(3), 15130(d), and 15183(b), a project's incremental contribution to a cumulative GHG emissions effect may be determined not to be cumulatively considerable if it complies with the requirements of

4.1.2 Implementation Activities

The City will implement the measures of the CAP Update through several types of programs and activities that can be grouped into the following categories. The categories identified for implementation efforts include: Municipal Operations; New Ordinances and Code Updates; Planning; Financing and Incentives; Partnerships; and Education and Outreach. While each measure identified in the CAP Update would fall into these categories, some measures overlap and belong to more than one category. For example, adding rainwater catchment systems (**Measure WW-2**) first requires the City to conduct outreach and provide education to residents and business owners about the systems, but would also require the City to provide sources of funding and incentives for installation. Detailed descriptions of each type of implementation category are provided below.

- **Municipal Operations:** City specific actions to update and make municipal operations more efficient. These measures would be implemented by the City and would reduce emissions specifically related to municipal operations.
- **New Ordinances and Code Updates:** Implementation of several measures in the CAP Update would occur through new ordinances adopted by the City or through amended regulations as part of municipal code updates.
- **Planning:** The CAP Update identifies measures that are more programmatic in nature and require visioning and long-term planning efforts to allow for GHG reductions.
- **Financing and Incentives:** Successful implementation of CAP Update measures requires identifying mechanisms for funding and allocating resources. Further, several measures identified in the CAP Update would be implemented by community residents, business owners, other local agencies, and developers.
- **Partnerships:** Interagency coordination and collaboration with other organizations are critical to ensuring implementation of certain measures.
- **Education and Outreach:** Education and outreach efforts about the goals of the CAP Update will help create support for the CAP Update and involve the community in its implementation. These efforts would be intended to increase participation and awareness and could include informing residents about potential GHG reductions and co-benefits of various measures.

4.1.3 Implementation Effort and Timeframe

Once the CAP Update has been adopted, City staff will need to develop a detailed implementation plan that will outline the actions the City will take to reduce its GHG emissions. The implementation plan will be based on a number of factors such as staff capacity, potential feasible work flows and the availability of funding opportunities. It will be the responsibility of department staff to facilitate and monitor the implementation of the measures. In the development of the implementation plan, staff will prioritize GHG reduction measure implementation based on a variety of factors including but not limited to cost-effectiveness, GHG reduction potential, available funding, the feasibility of implementation, timeline required to implement, and community input.

In advance of a detailed implementation plan, each action was qualitatively analyzed based on separate factors that could be used in prioritizing CAP measure implementation. These factors include GHG reduction potential, implementation effort, and implementation timeframe.

Levels of effort required to implement measures are based on staff implementation costs and ease of implementation, which were both evaluated for all CAP measures based on a scale of low, medium, or high. Consideration of staff implementation costs and the overall feasibility of implementation is needed to guide CAP measure implementation. Staff implementation costs are based on the anticipated levels of resources, staffing, and timeframe required to implement each measure. Implementation costs are not intended to represent the relative costs of compliance for residents and businesses, but rather focuses on the City's relative costs to facilitate program development and implementation. Ease of implementation is based on whether there are already existing programs that are related, coordination between different departments or agencies, and the comparison between existing and proposed measures.

The timeframe over which measures are implemented varies between short-term (i.e. within a year) and long-term (i.e. at least five years to implement). Prioritization of the measures is based on timeframe in which measures can be implemented. Certain measures should be prioritized early because they would require more effort and would take longer to implement. Assigning such measures a higher priority would allow the City to allocate resources appropriately.

Factors that could be used to prioritize GHG reduction measure implementation include, but are not limited to, cost-effectiveness, GHG reduction potential, available funding, the feasibility of implementation, timeline required to implement, co-benefits, and community input.

Sample criteria used to define the implementation efforts for each measure are shown in Table 4-1. It is possible for a measure to have a mix of implementation effort levels (i.e. have low staff implementation costs and high ease of implementation).

Table 4-1 Sample Evaluation Criteria for GHG Reduction Measure Implementation

Implementation Effort Level	Sample Criteria		
	Staff Costs	Ease of Implementation	Implementation Timeframe
Low/Short-Term	▶ Uses existing staff ▶ Existing staff can implement but will require reprioritization of workload	▶ Existing programs in place to support implementation. ▶ External and internal coordination is limited. ▶ Revisions to policy or code are limited.	▶ Less than a year to fully implement
Medium/Mid-Term	▶ Requires new staff or contracts to implement	▶ External and internal coordination is required. ▶ Policy or code revisions necessary.	▶ Implementation would take between 2-4 years
High/Long-Term	▶ Requires a significant amount of new staff or contracts to implement	▶ Development of new policies, programs, or codes, or revisions to the General Plan. ▶ Robust outreach program required to engage residents and businesses. ▶ Requires regional cooperation and securing long-term funding.	▶ At least five years required to implement

4.1.4 Implementation Strategy Matrix

The implementation strategy matrix, outlined below in Table 4-2, provides a summary of the initial prioritization and categorization of the CAP Update's GHG reduction measures. The matrix includes each GHG reduction measure, implementation activity type, responsible department or agency, implementation timeframe, and level of staff implementation cost and ease of implementation for each measure. Following adoption of the CAP Update, this implementation strategy matrix will serve as initial guidance for City staff. Future updates to the CAP will require the matrix to be adjusted according to feasibility and legislative requirements. Key staff in each department or agency will facilitate and oversee measure implementation, and allocate staff resources and secure funding as needed.

As the City begins implementing each action, measure-specific implementation plans will be developed where appropriate to further refine implementation details such as implementation timeframe, staff implementation costs and the timeframe required for implementation.

[Note to City: please carefully review contents of Table 4-2, including Responsible Department/Agency, Implementation Timeframe, Staff Implementation Costs, and Ease of Implementation]

Table 4-2 Preliminary Implementation Strategy Matrix

Measure	Title	Category	Responsible Department/ Agency	Implementation Timeframe	Staff Implementation Costs	Ease of Implementation
Transportation						
T-1	EV Incentives and Promotion	New Ordinances and Code Updates	PD	Mid-Term	Low	Medium
T-2	EV Charging Ordinance	New Ordinances and Code Updates	PD; BS	Mid-Term	Low	Medium
T-3	TOD Affordable Housing Program	Planning	PD	Ongoing	Medium	Medium
T-4	Murrieta Bike Network	Planning	PD; PW	Ongoing	Low	Medium
T-5	Signal Synchronization	Municipal Operations	PW	Mid-Term	Low	Medium
T-6	Traffic Calming Program	Planning	PW	Mid-Term	Low	Medium
T-7	Transportation Demand Management Program	Planning	PD; PW	Short-Term	Medium	Medium
T-8	Transit Network	Planning; Partnerships	PD; RTA	Mid-Term	Medium	Medium
T-9	GHG Reduction Program	Planning	PD	Long-Term	Medium	High
Building Energy						
BE-1	Community Renewable Energy	Financing and Incentives; Partnerships; Education and Outreach	PD; CM	Long-Term	High	High
BE-2	Municipal Renewable Energy	Municipal Operations	CSD; PW	Ongoing	Medium	High
BE-3	Zero Net Energy Standard	New Ordinances and Code Updates	PD; CM	Ongoing + Mid-Term	Medium	High
BE-4	Energy Efficiency and Electrification Program	Financing and Incentives; Partnerships; Education and Outreach	PD; BS	Ongoing	Low	Medium
Land Use						
LU-1	Jobs-Housing Balance Strategy	New Ordinances and Code Updates; Planning	PD	Ongoing	Medium	Medium
LU-2	Tree Planting Program	Partnerships	PD; CSD	Short-Term	Low	Low
LU-3	Open Space Conservation	Partnerships	PD; RCA	Ongoing	Low	Low
Solid Waste						
SW-1	Waste Diversion Program	New Ordinances and Code Updates; Partnerships	PD; PW	Mid-Term	Medium	High
SW-2	Construction Waste Diversion	New Ordinances and Code Updates;	PD; PW; BS	Mid-Term	Medium	High

Table 4-2 Preliminary Implementation Strategy Matrix

Measure	Title	Category	Responsible Department/ Agency	Implementation Timeframe	Staff Implementation Costs	Ease of Implementation
		Partnerships				
Water and Wastewater						
WW-1	Landscaping and Water Conservation Program	Financing and Incentives; Education and Outreach	PD; BS; CSD	Ongoing	Low	Medium
WW-2	Rainwater Catchment and Greywater Systems Program	Financing and Incentives; Education and Outreach	PD; BS	Ongoing	Low	Low

Notes: EV = Electric Vehicle; CM = City Manager's Office; CSD = Community Services; PD = Planning Division; PW = Public Works Department; BS = Building & Safety; RTA = Riverside Transit Agency; RCA = Regional Conservation Agency

4.1.5 Implementation Descriptions for Key Measures

The following section includes a description of how key CAP Update measures would be implemented and considerations for specific steps that could be taken to successfully implement the measures.

T-1 and T-2 – Electric Vehicle Programs

These measures are focused on increasing the number of EVs and ZEVs to achieve a higher percentage of vehicles in the City being EVs and ZEVs than what is currently projected for Riverside County. The City can provide a policy environment conducive to EV adoption and help remove barriers to help increase EV adoption rates. T-1 focuses on promoting and increasing EV ownership in the City and would include several components that would together create a comprehensive program. The program would include:

- An educational component to conduct outreach and educate residents about the benefits of EV ownership
- A marketing component to educate residents on current incentives and rebates available for purchasing an EV and installing residential EV charging equipment
- Updates to the City's development code to incentivize the installation of EV chargers in new and existing land uses
- An incentive program for the purchase of EVs and ZEVs for City residents potentially funded through the GHG Mitigation Fee Program (T-9)

T-2 focuses on developing and adopting an EV Infrastructure ordinance to ensure that new development in the City includes adequate EV charging infrastructure to keep pace with the City's increased EV adoption rates.

Implementation Items

- T-1
  - Research other cities and agencies (e.g., Pasadena) that have implemented similar programs in California and adopt components of programs that are appropriate for the development of the City program.
  - Work with Transportation Network Companies (e.g., Uber and Lyft) to promote EV adoption amongst drivers, promoting the benefits of EV's unique to drivers (e.g., lower maintenance costs, lower fuel costs).
  - Work with the South Coast Air Quality Management District, Southern California Association of Governments (SCAG), and Western Riverside Council of Governments (WRCOG) to discuss potential opportunities for collaboration in implementing the program. Develop an implementation plan and timeline for implementing the program by 2023.
- T-2

- Research other jurisdictions that have adopted EV ordinances to increase EV charging infrastructure (e.g., Menlo Park).
- Develop and adopt an EV ordinance to require appropriate levels of EV charging in new residential and nonresidential uses in the City.
- Promote available incentives for EV charging infrastructure to residents and developers in the City.

T-7 – Transportation Demand Management Program

This measure is focused on reducing commute-related VMT generated by new large employers in the city and the region. The measure would build on the City's existing Transportation Demand Management process in place to increase resources and support available to employers to help implement employer-based TDM programs, and increase the City's resources to manage and monitor progress of programs. Given that the City is focused on attracting new employers to develop a sustainable jobs-housing balance, the TDM measures included in the program would be designed to be conducive to development and attractive to employees to reduce commute costs and time. The TDM measures established as part of the program can be included in the City's CAP Consistency Checklist to effectively streamline this measure into the City's development process for new projects. The TDM Program measures could include, but are not limited to:

- A comprehensive marketing program targeted at employees to promote the benefits (health, cost savings) of low-GHG commute modes (e.g., walking, biking, transit, telecommuting, etc.);
- Requirements for short and long-term bicycle parking facilities including on site-amenities (e.g., showers, locker rooms);
- Incentives for using alternative modes (e.g., transit pass subsidies, carpool, parking cash-out program);
- A vanpool program for residents with longer commutes outside the City;
- A ride-matching and ride-sharing program for both employees working in the City and for residents who commute to regions outside the City (e.g., San Diego, Los Angeles);
- A telecommuting program to promote telecommuting for large employers in the City as well as advocating for telecommuting practices in the larger region with support from WRCOG; and
- A monitoring program to track progress on the VMT reductions achieved through the TDM program.

Implementation Items

- Research other cities and agencies in the region conducting comprehensive TDM Programs and adopt components of programs that are appropriate for development in the City's expanded program.
- Work with WRCOG and other regional partners to discuss potential collaboration on implementation components of the TDM Program.
- Develop TDM Program Implementation Plan and hire a Transportation Demand Management Coordinator to implement the TDM Program.
- Adopt a TDM Program ordinance that would apply to specific types of new development in the City and help reduce VMT generated from new projects. This ordinance can be implemented, in part, through the City's CAP Consistency Checklist.

T-9 – GHG Mitigation Fee Program for New Development

This measure is intended to reduce GHGs from new development in the City, particularly, but not exclusive to, GHG emissions associated with VMT generated by new residential and nonresidential development in the City. As part of the measure, the City would develop a program to mitigate a certain percentage of GHG emissions from new development through a fee-based program that would offset emissions through development of local mitigation projects. The total fee for different new development projects would be calculated based on key characteristics of the project (e.g., land use type, size) to estimate the anticipated GHG emissions of the project, similar to other impact fee programs (e.g., transportation impact fees). Applicants would then pay into a fee program for the project's GHG emissions that cannot be mitigated through other CAP measures. Mitigation

projects funded through the program would give priority to implementing local projects to reduce emissions in the city and then, once local options are exhausted, through a mitigation bank to contribute to larger mitigation projects (e.g., large transit projects). A key next step for the City in implementation of this measure would be to conduct a more in-depth analysis for how the fee program would be structured for successful implementation. Types of mitigation projects to be funded through the program could include but are not limited to:

- Funding of TDM measures which would result in GHG emissions reductions (e.g., transit pass subsidies, car-sharing program)
- Funding of larger transit projects which demonstrate VMT reductions and GHG emissions
- Appliance replacement programs to replace natural gas appliances with electric appliances
- Vehicle replacement programs to incentivize the purchase of EVs and ZEVs for residents and businesses

Implementation Items

- Research VMT Mitigation and Banking Programs including information in UC Berkeley's Technical Report "Implementing SB 743: An Analysis of Vehicle Miles Traveled Banking and Exchange Frameworks."
- Develop a comprehensive list of strategies, projects, and other opportunities to reduce GHG emissions which can be funded and implemented through the program.
- Choose or design the most appropriate framework for developing a GHG Mitigation Fee Program and incorporate the program into the City's development and environmental review processes.

BE-1 - Community Renewable Energy

The Western Community Energy Program (WCE) is a program established in 2018 to implement a Community Choice Aggregation (CCA) program for jurisdictions in western Riverside County. WCE's primary objectives are to provide local control in rate-setting for customers, provide overall rates that are lower and/or competitive with those offered by SCE, expanded options for economic development, and supply an energy portfolio that will use local and/or regional renewable resources. During Phase 1, beginning in 2020, WCE anticipates serving approximately 114,000 out of 120,500 residential and nonresidential accounts. Alongside serving as an energy provider, WCE also intends to develop an energy program to provide support for WCE customers conducting energy efficiency and renewable energy-related projects. It is anticipated that these programs could help in the implementation of other CAP measures (BE-4). Details regarding the development, governance, and operations of WCE can be found here in the Western Community Energy Implementation Plan.

Implementation Items

- Research existing CCA programs in California to understand how the programs operate and what success they have achieved.
- Work in collaboration with WRCOG and WCE to discuss the details and requirements for joining WCE, including the potential need for a feasibility study, costs and timeline for, and anticipated rates.
- Explore developing an alternative program with SCE to increase the purchase of renewable energy by residents and businesses that can achieve the GHG reductions quantified for the measure (BE-1).

BE-2 - Municipal Renewable Energy

Through this measure, the City has the opportunity to demonstrate leadership and sustainability by developing renewable energy systems for municipal operations. By increasing the City's renewable energy generation, the City can achieve long-term cost savings and increase the resilience of the City's municipal energy supply during power outages. WRCOG's Energy Department offers support, services, and access to financing for local jurisdictions that are conducting energy efficiency and renewable energy projects at municipal facilities.

Implementation Items

- Conduct audits at municipal facilities to quantify energy use and to identify and quantify energy efficiency and conservation opportunities.

- Based on energy audits, develop a list of energy efficiency and renewable energy projects that could be implemented as well as an implementation plan and timeline for the development of the projects.
- Identify grants, rebate and incentive programs (WRCOG program), and financing opportunities for municipal energy efficiency and renewable energy.

BE-3 - Zero Net Energy Standard

This measure focuses on developing a Zero Net Energy (ZNE) Standard for new residential and nonresidential projects in the City, with requirements phased in over time between 2020 and 2030. Beginning in approximately 2013, the California Energy Commission and California Public Utilities Commission began discussions of phasing in a ZNE standard for new construction in California. Since then, the State has been taking significant steps to phase in a standard, including the development of California's Zero Net Energy Action Plan and, most recently, the 2019 Energy Efficiency Standard Update, which requires solar installations for all single-family and low-rise multi-family homes. This measure is intended to help the City keep pace as the State moves closer to a ZNE standard for all new development and get ahead of the curve of anticipated changes to come.

Implementation Items

- Research California's Zero Net Energy Action Plan and other ZNE resources, including other ZNE standards that have been adopted by California cities (e.g., San Jose).
- Identify potential funding opportunities, technical support, and resources in helping to develop a ZNE standard for both residential and nonresidential uses.
- Develop ZNE standard and detailed timeline for implementation of the standard for different land uses.
- Identify forthcoming residential development projects that could potentially serve as a case study for early adoption of the City’s ZNE standard.

BE-4 - Energy Efficiency and Electrification Program

This measure focuses on developing a comprehensive electrification and energy efficiency retrofit program focused on the reduction of natural gas use in existing residential and commercial land uses. The program would include multiple components, in collaboration with regional partners, focusing on various aspects of energy conservation, energy efficiency, and building electrification. These programs would likely include:

- An energy conservation marketing campaign to achieve energy cost savings through conservation practices and tools to help monitor and lower energy use.
- An energy efficiency assessment and retrofit program to help residents and businesses assess energy efficiency opportunities and incentives for energy efficiency upgrades.
- An appliance retrofit program focused on upgrading to all-electric appliances in some existing buildings (i.e., water heaters, cooktops, heating systems, pool heating systems) but would also include energy efficient electric appliances (e.g., refrigerators, televisions).

Implementation Items

- Work with WRCOG and WCE to discuss opportunities for collaboration and support in implementing the City’s Energy Efficiency and Electrification Program including opportunities to share data and resources.
- Conduct research regarding the implementation of similar programs in other California cities and agencies. Develop an implementation timeline and plan for the development of the program with assistance from WRCOG and WCE when appropriate.
- Develop Energy Efficiency and Electrification Program and set internal targets for energy reductions that are consistent with the estimate used to quantify this measure.

LU-1 - Jobs-Housing Balance Strategy

This measure is intended to support the City in achieving a sustainable jobs-housing balance by implementing strategies to attract new employers to the City and the surrounding region and, as a result, reducing commute-related VMT for residents and improving quality of life. This measure requires that the City exercise flexibility in land use regulations to respond to requirements of new and emerging business and industry types as well as ensuring the regulatory environment in the City remains attractive to large employers looking to locate in the City.

Implementation Items

- Research strategies to update the City's development code to ensure flexibility in building standards when working with large employers who are considering locating in the City.
- Work with WRCOG, SCAG, and the Murrieta Chamber of Commerce to understand the growth population and employment characteristics in the region and opportunities to create a sustainable jobs-housing balance for residents.
- Adjust the development code and long-term nonresidential land use development strategy in the City to ensure the City is taking advantage of regional growth opportunities in key employment sectors and industries.

4.2 Monitoring and Updates

In order for the CAP Update to remain effective and consistent with State and regional protocols, it will need to be maintained and updated periodically. Although the CAP Update provides a long-term strategy to reduce GHG emissions and improve the sustainability and resilience of the City, new legislation and updates to climate science will need to be considered as it implements reduction measures. Thus, City staff will need to evaluate and monitor specific action performance over time. At the time when the plan and specific action are reviewed, the City will revise as necessary to ensure goals identified in the CAP Update remain achievable within the context of the identified actions. This will include conducting periodic GHG emissions inventory updates and analyzing measure performance.

Upon adoption, the City will begin to implement CAP measures and actions. The City will begin data tracking and initial monitoring beginning two years after the CAP Update's adoption. Every two years, City Staff will prepare a monitoring report, describing the estimated GHG reductions achieved to date through the implementation of CAP actions. On an annual basis, City Staff will provide the City Council a summary of the progress made over the year implementing CAP actions. These annual summaries and biennial monitoring reports will provide transparency in CAP implementation and allow the City opportunities to adjust measures as necessary to achieve emissions reduction targets.

The City will:

- Prepare an annual progress summary after the first year of implementation.
- Prepare a monitoring report to City Council every 2 years; and
- Prepare a CAP update every 5 years.

In addition to updating the City's emissions inventory, City staff will also evaluate the cost, effectiveness, and benefits of each individual measure to determine prioritization and feasibility. Evaluating CAP measure performance entails monitoring the level of community participation, costs, and barriers to implementation, as well as actual reductions in activities evaluated in the CAP Update or other activities that result in GHG emissions reductions. By evaluating whether the implementation of a measure is on track to achieve its reduction potential, the City can identify successful measures and reevaluate or replace those that do not provide sufficient GHG emission reductions.

The report provided to City Council every 2 years will include:

- estimated annual GHG reductions,
- participation rates (where applicable),
- implementation costs and funding needs,
- community benefits realized,

- remaining barriers to implementation, and
- potential recommendations for changes to specific actions.

In addition to the monitoring reports, the City will update its CAP every five years, one year after the second biennial CAP monitoring report.

4.2 Ongoing Engagement

Ongoing engagement and education are critical for successful implementation of all measures. This includes involvement with residents and businesses, community organizations, developers, property owners, and other local and regional government agencies and organizations. While this CAP Update focuses on measures in which the City has a role, many of the measures require partnership and collaboration as suggested in the preliminary implementation matrix, **Table 4-2**.

Individual residents of Murrieta play a large role in the success of the CAP. Thus, effective and long -term climate action and resiliency in the city can only be achieved through efforts that continue to change the way individuals interact with the environment. Through public education efforts, the City is also committed to educating its community members about the important role individuals play in combating climate change by reducing emissions. Many actions identified in **Chapter 3** require public involvement to achieve GHG emission reduction targets. It will be the City's responsibility to promote increased community awareness and participation in existing programs, or connecting the community with new information, tools, funding or resources.

4.3 Funding Sources

Implementation of GHG reduction measures to increase energy efficiency and reduce the use of non-renewable resources will result in substantial cost-savings for the City and its residences in the long term. The City will undergo initial start-up, ongoing administration, staffing, and enforcement costs with implementation which will require seeking cost-effective implementation and strategic funding opportunities and developing partnerships to share costs. All measures with potential for significant costs will be brought to City Council for consideration and approval.

To reduce the cost burden of implementation, a variety of funding sources are available to the City. A preliminary summary of funding and financing options are summarized in **Table 4-3**; however, these funding sources and programs are subject to change over time. As the CAP is updated and monitored, the City will need to reevaluate its overall costs and funding sources available.

Table 4-3 Potential Funding Sources to Support Greenhouse Gas Reduction Measures

Funding Source	Description
For City Operations	
California Department of Resources Recycling and Recovery (CalRecycle)	▸ CalRecycle grant programs allow jurisdictions to assist public and private entities in management of waste streams. ▸ Incorporated cities and counties in California are eligible for funds. ▸ Program funds are intended to: • Reduce, reuse, and recycle all waste. • Encourage development of recycled-content products and markets. • Protect public health and safety and foster environmental sustainability.
California Air Resources Board (CARB)	▸ CARB offers several grants, incentives, and credit programs to reduce on-road and off-road transportation emissions. Residents, businesses, and fleet operators can receive funds or incentives depending on the program. ▸ The following programs can be utilized to fund local measures: • Air Quality Improvement Program (Assembly Bill (AB) 118) • Loan Incentives Program

Table 4-3 Potential Funding Sources to Support Greenhouse Gas Reduction Measures

Funding Source	Description
	• California Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project
Transportation-Related Federal and State Funding	▶ For funding measures related to transit, bicycle, or pedestrian improvements, the following funding sources from the Southern California Association of Governments (SCAG) may be utilized: • Sustainability Planning Grant Program • Fixed Guide Way Capital Investment Grants • Job Access and Reverse Commute and New Freedom Programs • Enhanced Mobility of Seniors & Individuals with Disabilities
New Development Impact Fees	▶ These types of fees may have some potential to provide funding for proposed programs and projects, but such fees are best implemented when the real estate market and overall regional economic conditions are strong.
General Obligation Bond	▶ A general obligation bond is a form of long-term borrowing and could be utilized to fund municipal improvements.
Other Funding Mechanisms for Implementation	▶ Grants may be available from the Strategic Growth Council (SGC) or the State Department of Conservation (DOC) to fund sustainable community planning, natural resource conservation, and development, and adoption.
For Community Operations	
Southern California Edison (SCE)	▶ SCE is one of the utilities participating in the Go Solar initiative. ▶ A variety of rebates are available for existing and new homes. ▶ Photovoltaics, thermal technologies, and solar hot water projects are eligible. ▶ Single-family homes, commercial development, and affordable housing are eligible.
Property-Assessed Clean Energy (PACE)	▶ The PACE finance program is intended to finance energy and water improvements within a home or business through a land-secured loan, and funds are repaid through property assessments. ▶ Municipalities are authorized to designate areas where property owners can enter into contractual assessments to receive long-term, low-interest loans for energy and water efficiency improvements, and renewable energy installation on their property. ▶ Financing is repaid through property tax bills. ▶ Western Riverside Council Governments (WRCOG) has implemented the Home Energy Renovation Opportunity (HERO; a PACE program) in the County to assist residents in financing residential energy efficiency and solar retrofits.
Clean Vehicle Rebate Program	▶ Individual, fleet operators, local government entities, and businesses can apply for rebates for purchases of plug-in electric hybrids (PHEVs), battery electric vehicles (BEVs), fuel-cell electric vehicles (FCEVs), and other non-highway, motorcycle and commercial BEVs.
Energy Upgrade California	▶ Program is intended for home energy upgrades. ▶ Funded by the American Recovery and Reinvestment Act, California utility ratepayers, and private contributions. ▶ Utilities administer the program, offering homeowners the choice of one of two upgrade packages—basic or advanced. ▶ Homeowners are connected to home energy professionals. ▶ Rebates, incentives, and financing are available. ▶ Homeowners can receive up to $4,000 back on an upgrade through the local utility.
Federal Tax Credits for Energy Efficiency	▶ Tax credits for energy efficiency can be promoted to residents.
Energy Efficient Mortgages (EEM)	▶ An EEM is a mortgage that credits a home's energy efficiency in the mortgage itself. ▶ Residents can finance energy saving measures as part of a single mortgage. ▶ To verify a home's energy efficiency, an EEM typically requires a home energy rating of the house by a home energy rater before financing is approved. ▶ EEMs typically are used to purchase a new home that is already energy efficient, such as an ENERGY STAR® qualified home.
Private Funding	▶ Private equity can be used to finance energy improvements, with returns realized as future cost savings.

Table 4-3 Potential Funding Sources to Support Greenhouse Gas Reduction Measures

Funding Source	Description
	▶ Rent increases can fund retrofits in commercial buildings. ▶ Net energy cost savings can fund retrofits in households. ▶ Power Purchase Agreements (PPA) involve a private company that purchases, installs, and maintains a renewable energy technology through a contract that typically lasts 15 years. After 15 years, the company would uninstall the technology or sign a new contract. ▶ On-Bill Financing (OBF) can be promoted to businesses for energy-efficiency retrofits. Funding from OBF is a no-interest loan that is paid back through the monthly utility bill. Lighting, refrigeration, heating, ventilation, and air conditioning, and light-emitting diode streetlights are all eligible projects.
Community Choice Aggregation (CCA) Revenue	▶ Revenue generated by a local CCA program may be used to fund or incentivize GHG reduction measures.
Housing Rehabilitation Loan Programs	▶ Critical Home Repair Program through Habitat for Humanity provides home improvements for low-income homeowners to improve home efficiency, safety, and accessibility. ▶ The U.S. Department of Housing and Urban Development (HUD) Community Development Block Grant (CDBG) program provides communities with resources to address redevelopment needs, specifically for home rehabilitation. ▶ HUD also administers the HOME program, providing grants to improve affordable housing opportunities and conditions.
General Funding and Staff Capacity	
CivicSpark Program	▶ Supports sustainability-focused research, planning, and implementation projects throughout California by providing public agencies and other organizations with capacity building support and community engagement ▶ Provides volunteer engagement through AmeriCorps fellows to provide added staff capacity for eleven months
California Climate Investments (CCI)	▶ CCI is the statewide initiative that provides funds from the Cap-and-Trade program for GHG reducing projects and programs. ▶ Funds can support a variety of projects including affordable housing, renewable energy, public transportation, zero-emission vehicles, environmental restoration, sustainable agriculture, recycling, and more. ▶ Numerous State programs listed above are funded by CCI; however, the program continues to evolve and is updated by the State periodically to include new or modified programs.

Source: Ascent Environmental 2019

APPENDIX A
Final Technical Memorandum: Greenhouse Gas Emissions Inventory, Forecasts, and Reduction Targets

Memo

455 Capitol Mall, Suite 300
Sacramento, CA 95814
916.444-7301

Date: July 12, 2019

To: Danny Serrano, RICK Engineering

From: Andrew Martin and Kai Lord-Farmer, Ascent Environmental

Subject: City of Murrieta Climate Action Plan Update
Draft Technical Memorandum: Greenhouse Gas Emissions Inventory, Forecasts, and Reduction Targets

INTRODUCTION

The City of Murrieta (City) adopted a Climate Action Plan (CAP) on July 19, 2011, as part of the City's 2011 General Plan. The City's 2011 CAP included a goal to reduce emissions to 1990 levels by 2020 to remain consistent with the statewide greenhouse gas (GHG) emission reduction goal set forth in Assembly Bill 32. The City is currently updating its Climate Action Plan concurrent with efforts to prepare a focused update of the City's General Plan (GPU). The updated CAP will be consistent with new State legislation and guidance issued since the 2011 CAP was adopted. Ascent has completed several technical analyses required for the preparation of the CAP update, including: (1) a new 2016 GHG emissions inventory to serve as the baseline year for the CAP; (2) new GHG emission forecasts for 2020, 2030, 2035 (GPU horizon year) and 2050; (3) revised GHG emission reduction targets for the forecast years. This technical memorandum summarizes the results of the analyses, including methods, assumptions, emission factors, and data sources.

ORGANIZATION OF THIS MEMORANDUM

This memorandum consists of four main sections:

- **Section 1: GHG Emissions Inventory** summarizes the 2016 GHG emissions inventory developed. The emissions inventory includes the following emissions sectors: building energy, on-road transportation, off-road transportation, solid waste, water use, and wastewater.

- **Section 2: GHG Emissions Forecasts** summarizes the forecasted GHG emissions under "business-as-usual" (BAU) and legislative-adjusted BAU scenarios. A BAU scenario is one in which no action is taken by local, State or federal agencies to reduce GHG emissions. A legislative-adjusted scenario is one in which BAU conditions are adjusted to reflect policy or regulatory actions enacted by State or federal agencies, but without considering any local actions to reduce GHG emissions.

- **Section 3: GHG Reduction Targets** identifies recommended GHG emission reduction targets for 2020, 2030, 2035, and the longer-term goal for 2050, and shows the calculated gap between estimated GHG reductions under the forecast scenarios and the recommended emission reduction targets. The recommended GHG emission reduction targets for each year are provided to demonstrate consistency between the City's GHG emissions and State GHG reduction targets established through legislation and executive order.

- **Section 4: Next Steps** briefly discusses the next steps in the climate action planning process and what is needed to achieve the GHG reduction targets discussed in Section 3.

1 EMISSION INVENTORY

1.1 2016 GREENHOUSE GAS EMISSIONS INVENTORY

The purpose of the GHG emissions inventory is to gain an understanding of the sources and levels of GHG emissions within the City's jurisdiction, as well as to establish a baseline against which future GHG emissions forecasts can be compared. The GHG emissions inventory for the City was prepared for the calendar year 2016. The 2016 GHG emissions inventory is considered the baseline year for the preparation of GHG emissions forecasts and GHG reduction targets that will be used in the City's CAP update.

The 2016 GHG emissions inventory is summarized below in Table 1. GHG emissions in this inventory include communitywide emissions resulting from activities occurring and permitted to occur within the existing city limits in 2016, which were approximately 890,520 metric tons of carbon dioxide equivalent ($MTCO_2e$). The emissions sectors included in the inventory are residential and commercial energy use, industrial energy use, on-road vehicles, off-road vehicles, solid waste, water use, and wastewater. The largest emissions sector is on-road vehicles, representing approximately 76 percent of all communitywide GHG emissions in 2016.

Table 1 2016 City of Murrieta Communitywide Greenhouse Gas Inventory

Sector	2016 ($MTCO_2e$/year)	Percent of Total
On-Road Vehicles	679,920	76%
Off-Road Vehicles	11,741	1%
Transportation Sector Total	691,661	77%
Residential Energy	104,352	12%
Commercial Energy	27,410	3%
Industrial Energy	24,784	3%
Building Sector Total	156,546	18%
Solid Waste	40,038	4%
Wastewater and Water-Related	2,275	0.3%
Total (All Sectors)	890,520	100%

Notes: Totals may not add due to rounding. $MTCO_2e$ = metric tons of carbon dioxide equivalent; GWP = Global Warming Potential

Source: Data compiled by Ascent Environmental in 2019.

2 EMISSIONS FORECASTS

2.1 GREENHOUSE GAS EMISSIONS FORECASTS TO 2020, 2030, 2035, 2050

Emission forecasts were calculated for two emissions scenarios, including (1) BAU conditions and (2) legislative-adjusted BAU conditions. The BAU forecast scenario accounts for future growth in emissions associated with future growth and activity levels in the City but assumes no future action to reduce GHG emissions by State or federal agencies. In contrast, the legislative-adjusted BAU (ABAU) forecast scenario accounts for future growth in emissions associated with future growth and activity levels in the City, along with legislative actions to reduce emissions due to State and federal regulations, programs, or other mandated actions. A summary of legislative reductions applied is provided below in Table 5. These forecast scenarios provide the City with the information needed to focus its GHG reduction efforts on the emission sectors and sources that have the most GHG reduction opportunities, considering what State and federal legislative reductions are already achieving or are expected to achieve in the future.

BAU forecasts described in this section for 2020, 2030, 2035 and 2050 are generally based on the State's GHG reduction target years established in key State legislation and policies, including Assembly Bill (AB) 32, Senate Bill (SB) 32, Executive Order (EO) B-30-15, and EO S-3-05; as well as the buildout year for the GPU (2035). The Statewide GHG reduction targets are as follows:

- 1990 levels by 2020 (AB 32);
- 40 percent below 1990 levels by 2030 (SB 32 and EO B-30-15); and,
- 80 percent below 1990 levels by 2050 (EO B-30-15 and S-3-05).

Estimated BAU emission forecasts were based on demographic forecasts, including annual population, jobs, and household growth between 2016 and 2050 for the City, as developed by Iteris and VRPA for the traffic and vehicle miles traveled (VMT) modeling of the GPU. To remain consistent with the demographic forecasts used for the GPU traffic and VMT modeling, Ascent has used forecast data provided by Iteris and VRPA regarding population, jobs, and household growth in the City through the year 2040. These forecasts are based on the land use configuration to be included in the GPU. Ascent has extrapolated a population, jobs, and household growth estimate for 2050 using the growth rates provided between 2016 and 2040. Table 2 below shows the annual growth rates for 2020, 2030, 2035 and 2050. To estimate long-term growth trends and account for variability in short-term growth trends (e.g., 2020-2030), Ascent has used the 2016-2050 annual growth rate in the forecasted BAU and ABAU scenarios.

Table 2 Annual Growth Factors (%)

Factor	2016 to 2020	2020 to 2030	2030 to 2035	2035 to 2050	2016 to 2050
Population	1.07	1.00	0.93	0.94	0.97
Jobs	7.68	5.07	3.63	4.21	4.78
Dwelling Units	1.25	1.15	1.06	1.00	1.00
Vehicle Miles Traveled	1.69	1.52	1.36	1.40	1.46

Source: Data compiled by Ascent Environmental in 2019.

Table 3 shows the population, jobs, household, and daily VMT forecast that was provided by Iteris and VRPA with 2050 projections extrapolated based on the 2016 through 2040 annual growth rate.

Table 3 Demographic and Daily Vehicle Miles Traveled Forecast (2016-2050)

Factor	2016	2020	2030	2035	2050
Population	110,897	115,718	127,772	133,798	154,003
Jobs	28,628	38,485	63,128	75,450	139,986
Dwelling Units	35,534	37,341	41,859	44,118	49,912
Daily Vehicle Miles Traveled	4,132,649	4,419,630	5,137,080	5,495,806	6,768,910

Source: Data compiled by Ascent Environmental in 2019.

Table 4 includes the BAU emissions forecast for each emissions sector from 2016 through 2050. Table 4 also includes the growth factor which was applied to each emissions sector and the annual activity data which was used to estimate emissions in each sector.

Table 4 Business-As-Usual Forecasts ($MTCO_2e$/year)

Sector	Activity Data	Growth Factor	2016	2020	2030	2035	2050
Residential Energy	Kilowatts (kW) and Therms	Population	114,112	131,204	190,170	139,230	161,409
Commercial Energy		Jobs	27,410	31,418	45,102	54,575	99,861
Industrial Energy		Jobs	24,784	29,872	47,643	60,169	121,191
On-Road Vehicles	VMT	VMT	679,920	727,135	845,173	904,192	1,113,648
Off-Road Vehicles	Diesel Fuel Use	OFFROAD Model[1]	11,741	12,580	15,237	16,755	19,781
Solid Waste	Landfill Disposal Rate (Tons)	Population	40,038	41,778	45,834	48,102	55,601
Wastewater and Water-Related	Million Gallons (MG) wastewater processer; kW	Population	2,275	2,008	2,063	2,165	2,239
Total			**900,280**	**963,647**	**1,133,343**	**1,225,187**	**1,573,729**

Notes: $MTCO_2e$/year = metric tons of carbon dioxide equivalent per year.

1. Off-Road Vehicle emissions were estimated using the California Air Resources Board 2017 OFFROAD Model which included annual forecast of off-road vehicle use in Riverside County through 2050.

Source: Data compiled by Ascent Environmental in 2019.

By comparison with the BAU analysis, the City's GHG emissions, accounting for applicable legislative reductions, would decrease by 9 percent between 2016 and 2035 rather than increase by 36 percent without legislative reductions, as shown in Tables 3 and 4 and in Figure 1. Figure 1 also shows the emissions trend that would occur without anticipated legislative reductions and accounting for emission growth in the City without anticipated legislative reductions. Table 5 includes the ABAU emissions forecast for each emissions sector from 2016 through 2050. The legislative reductions applied to each GHG emissions sector are summarized below in Table 6.

Table 5 Legislative-Adjusted Business-As-Usual Forecasts ($MTCO_2e$/year)

Sector	2016	2020	2030	2035	2050
Residential Energy	114,112	114,180	113,865	114,775	116,927
Commercial Energy	27,410	42,071	51,518	59,829	101,023
Industrial Energy	24,784	4,274	3,389	3,004	266
On-Road Vehicles	679,920	669,154	592,254	585,860	591,645
Off-Road Vehicles	11,741	12,580	15,237	16,755	19,781
Solid Waste	40,038	34,182	37,501	39,356	45,491
Wastewater and Water-Related	2,275	1,916	1,410	1,208	456
Total	**900,280**	**878,357**	**815,174**	**820,787**	**875,589**

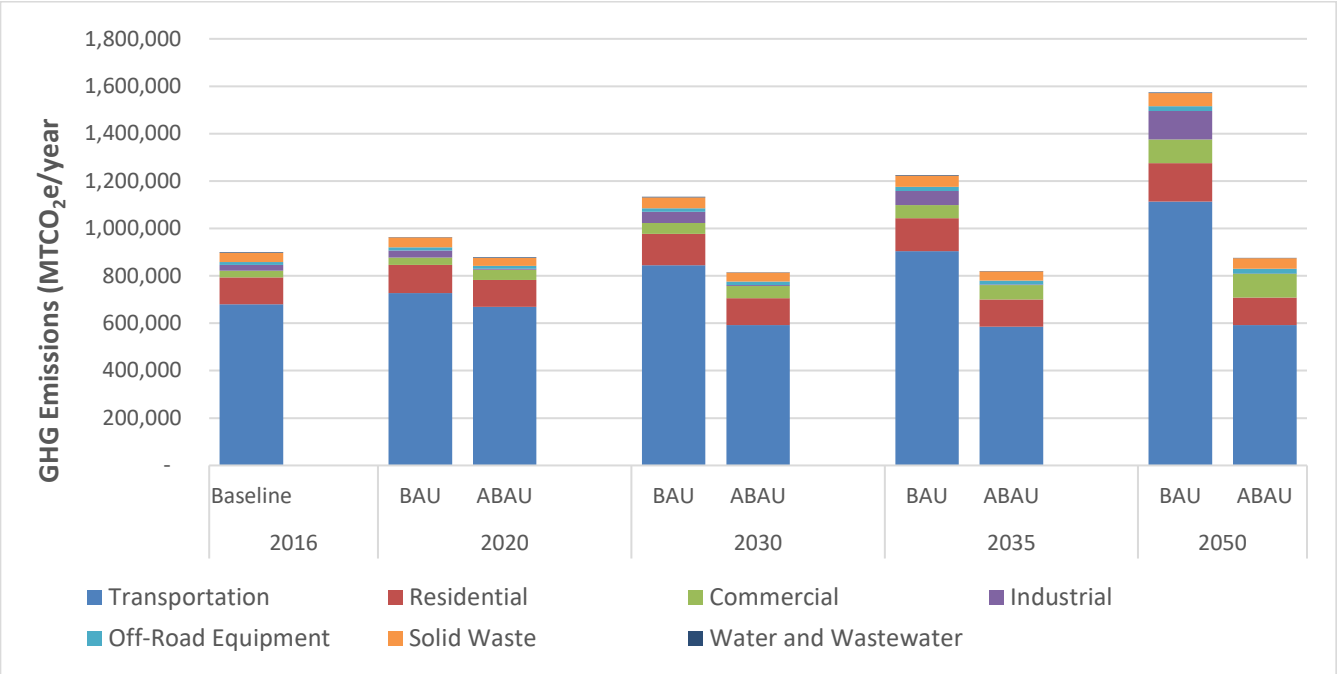
Notes: $MTCO_2e$/year = metric tons of carbon dioxide equivalent per year.

Source: Data compiled by Ascent Environmental in 2019.

Table 6 Legislative Reductions Summary

Source	Legislative Reduction	Description	Sectors Applied
State	RPS	Requires California energy utilities to procure 33 percent of electricity from renewable sources by 2020.	Building Energy, Water
State	SB 100	Requires California energy utilities to procure 60 percent of electricity from renewable sources by 2030 and 100 percent from renewable and zero-carbon sources by 2045.	Building Energy, Water
State	California Building Efficiency Standards (Title 24, Part 6)	Requires all new buildings in California to comply with energy efficiency standards established by CEC.	Building Energy
State	AB 341	California target to achieve a 75 percent solid waste diversion target by 2020.	Solid Waste
State	Pavley Clean Car Standards	Establishes GHG emission reduction standards for model years 2009 through 2016 that are more stringent than federal CAFE standards.	On-Road Vehicles
State	Advanced Clean Car Standards	Establishes GHG emission reduction standards for model years 2017 through 2025 that are more stringent than federal CAFE standards.	On-Road Vehicles
State	SBX7-7	Requires a 20 percent reduction in per capita water usage by 2020.	Water
Federal	Fuel Efficiency Standards for Medium- and Heavy-Duty Vehicles	Establishes fuel efficiency standards for medium- and heavy-duty engines and vehicles.	On-Road Vehicles

Notes: AB = Assembly Bill; CAFE = Corporate Average Fuel Economy; CEC = California Energy Commission; EPA = Environmental Protection Agency; GHG = greenhouse gas; RPS = Renewable Portfolio Standard; SB = Senate Bill; VMT = vehicle miles traveled. Source: Ascent Environmental 2019.



Notes: BAU = Business-As-Usual; ABAU = Legislative-Adujsted Business-As-Usual; GHG = greenhouse gas; $MTCO_2e$/year = metric tons of carbon dioxide equivalent per year.

Figure 1 Business-As-Usual and Legislative-Adjusted Business-As-Usual Emissions Forecasts

Emission forecasts under the legislative-adjusted BAU forecast scenario are detailed for each sector and discussed below.

2.1.2 Building Energy

Emissions from future electricity and natural gas use were estimated by multiplying anticipated energy use with forecasted emission factors. Future energy use was forecasted in three parts. First, energy use was scaled by growth factors detailed in Table 2. Second, energy emission factors were adjusted to reflect California's Renewables Portfolio Standard (RPS) targets. Electricity emission factors are anticipated to decline based on current regulations, while natural gas emission factors stay constant. Third, energy intensity factors were adjusted to reflect increased stringency expected under California's Title 24 building energy efficiency standards (i.e., 2019 standards which will go into effect on January 1, 2020) and are expected to achieve decreases in electricity and natural gas consumption in new construction. The residential building sector also accounts for emissions associated with residential electric vehicle (EV) charging which takes into account the percentage of VMT in future years based on projections in EMFAC 2017. The assumptions to energy efficiency and future electricity emission factors are described below. Table 7 summarizes the legislative factors used to scale building use by energy type.

Table 7 Building Energy Emissions Forecast Methods and Legislative Reductions by Source

Energy Type	Forecast Methods	
	Scale Factor	Applied Legislative Reductions
Electricity	Population growth for residential building energy; job growth for commercial/industrial building energy.	RPS achieved and scheduled targets (i.e., 33 percent renewable by 2020, 60 percent renewable by 2030, 100 percent renewable or zero-carbon by 2045) applied to SCE's emission factors. Accounts for 2016 to 2019 Title 24 energy efficiency gains in new construction.
Natural Gas	Population growth for residential building energy; job growth for commercial/industrial building energy.	Accounts for 2016 to 2019 Title 24 energy efficiency gains in new construction.

Notes: RPS = Renewable Portfolio Standard; SCE= Southern California Edison
Source: Ascent Environmental 2019.

RESIDENTIAL BUILDING ENERGY

Between 2016 and 2035, electricity and natural gas emissions from residential buildings would increase by 5 percent from 114,112 to 116,927 $MTCO_2e$ per year with legislative adjustments. Table 8 shows the baseline and legislative-adjusted BAU forecasted emissions from the residential building energy sector by energy type for 2016, 2020, 2030, 2035, and 2050.

Table 8 Residential Building Energy Legislative-Adjusted Business-As-Usual Emissions Forecasts (2016-2050) ($MTCO_2e$/year)

Energy Type	2016	2020	2030	2035	2050
Electricity (Associated with Residential EV Charging)	64	293	962	1,228	0
Electricity	29,849	26,372	16,514	16,928	0
Natural Gas	84,199	87,515	96,389	101,158	116,927
Total Residential Building Energy Emissions	**114,112**	**114,180**	**113,865**	**119,314**	**116,927**

Notes: Totals may not add due to rounding. $MTCO_2e$ = metric tons of carbon dioxide equivalent.
Source: Data compiled by Ascent Environmental in 2019.

COMMERCIAL AND INDUSTRIAL BUILDING ENERGY

Between 2016 and 2035, electricity and natural gas emissions from commercial and industrial buildings would increase by 58 percent from 42,489 to 65,391 $MTCO_2e$ per year with legislative adjustments. Table 9 shows the baseline and legislative-adjusted BAU forecasted emissions for the commercial and industrial building energy sector by energy type for 2016, 2020, 2030, 2035, and 2050.

Table 9 Commercial and Industrial Building Energy Legislative-Adjusted Business-As-Usual Emissions Forecasts (2016-2050) ($MTCO_2e$/year)

Energy Type		2016	2020	2030	2035	2050
Commercial Energy	Electricity	17,651	17,170	11,804	12,898	0
	Natural Gas	20,660	24,901	39,715	50,156	101,023
Industrial Energy	Electricity	4,124	4,208	3,285	3,829	0
	Natural Gas	54	66	105	132	266
Total Commercial and Industrial Building Energy Emissions		**42,489**	**46,345**	**54,908**	**67,015**	**101,289**

Notes: Totals may not add due to rounding.
$MTCO_2e$ = metric tons of carbon dioxide equivalent.
Source: Data compiled by Ascent Environmental in 2019.

ELECTRICITY EMISSION FACTORS

Electricity emissions from the building energy sector would see declines through 2045 without additional City action, despite growth, due to State measures already in place. Electricity emission factors for carbon dioxide equivalent (CO_2e) are based on Southern California Edison's (SCE) emission factor reported for 2016 (SCE 2016). California utility providers, including SCE, are scheduled to reach a 33 percent renewable electricity generation mix by 2020 and 60 percent by 2030, and 100 percent by 2045 pursuant to statewide implementation of the RPS and 100 percent electricity from renewable or zero-carbon sources pursuant to SB 100. SCE's 2016 emission factor was 0.24 metric tons of CO_2 per megawatt hour of electricity generated ($MTCO_2e$/MWh). By 2030, the emission factor will be 0.060 $MTCO_2e$/MWh. Consistent with SB 100, it was assumed that SCE would generate 100 percent of its electricity from renewable sources by 2045. For the purposes of this forecast, it is assumed that SCE would continue to make progress towards achieving the 2045 zero-carbon goal after 2030 so their 2035 emissions factor would decrease to 0.045 $MTCO_2e$/MWh.

ENERGY EFFICIENCY

The State's Title 24 Building Energy Efficiency Standards apply to both new construction and existing buildings. The 2019 Title 24 standards will go into effect in January 2020. The California Energy Commission (CEC) estimates that new residential buildings built to the 2019 standards would be 53 percent more efficient than residential buildings built to the previous standards (CEC 2015). CEC estimates that new non-residential built to the 2019 standards would be 30 percent more efficient than non-residential buildings built to the previous standards (CEC 2018).

2.1.3 Water and Wastewater

Between 2016 and 2035, water- and wastewater-related emissions from the City would decrease by 34 percent from 2,275 to 1,479 $MTCO_2e$ per year. This change reflects an increase in water consumption and wastewater generation with lower electricity factors related to the 2020, 2030, and 2045 RPS targets, consistent with SB 100 legislative actions described above, as well as a 20 percent water efficiency reduction, consistent with SBX7-7. Table 10 summarizes the legislative reductions used to forecast water and wastewater emissions.

Table 10 Water and Wastewater Forecast Methods and Legislative Reductions by Source

Source	Forecast Methods	
	Scale Factor	Applied Legislative Reductions
Water Consumption	Population growth.	Assumes electricity use for pumping, conveyance, and treatment follow the 2020, 2030, and 2045 RPS and zero-carbon schedule. Assumes a 20 percent reduction in water-related energy due to 20 percent reduction in water usage per requirements of SBX7-7.
Wastewater Treatment	Population growth.	Assumes electricity use for pumping, conveyance, and treatment follow the 2020, 2030, and 2045 RPS and zero-carbon schedule. Assumes a 20 percent reduction in wastewater-related energy due to 20 percent reduction in water usage per requirements of SBX7-7.

Notes: RPS = Renewable Portfolio Standard.
Source: Ascent Environmental 2019.

Table 11 shows the baseline and legislative-adjusted BAU forecasted emissions from water- and wastewater-related sources for 2016, 2020, 2030, 2035, and 2050. Population growth rates and electricity emission factors are detailed in Table 3 and Section 1.2.1.

Table 11 Water and Wastewater Legislative-Adjusted Business-As-Usual Emissions Forecasts (2016-2050) ($MTCO_2e$/year)

Activity	2016	2020	2030	2035	2050
Water-Related	1,605	1,242	817	643	0
Wastewater Treatment	670	674	593	565	456
Total Water and Wastewater Emissions	**2,275**	**1,916**	**1,410**	**1,208**	**456**

Notes: Totals may not add due to rounding.
$MTCO_2e$ = metric tons of carbon dioxide equivalent.
Source: Data compiled by Ascent Environmental in 2019.

2.1.4 Solid Waste

Between 2016 and 2030, solid waste emissions generated from the City would increase by two percent from 40,038 to 39,356 $MTCO_2e$ per year with legislative adjustments applied. Table 12 summarizes the legislative reductions used to forecast emissions from the solid waste sector.

Table 12 Solid Waste Forecast Methods and Legislative Reductions by Source

Source	Forecast Methods	
	Scale Factor	Applied Legislative Reductions
Landfill Disposal	Population growth.	Assumes California's 75 percent waste diversion goal would be achieved by 2020.

Source: Ascent Environmental 2019.

The forecasts shown in Table 13 below account for the CH_4 and CO_2 emissions from waste decay generated annually. With respect to solid waste generation, the California Department of Resources Recycling and Recovery (CalRecycle) established a target pursuant to AB 341 (Chapter 476, Statutes of 2011) to achieve a statewide waste diversion of 75 percent by 2020, which is equivalent to a disposal rate of 2.7 pounds of waste per resident per day. The City's waste disposal tonnage, disposal rates, and disposal targets are reported to CalRecycle by year. Emission forecasts for this sector assume the City will achieve a disposal rate of 2.7 pounds of waste per resident per day and would remain constant after 2020 through 2050.

Table 13 shows the baseline and legislative-adjusted BAU forecasted emissions from the solid waste sector for 2016, 2020, 2030, 2035, and 2050.

Table 13 Solid Waste Legislative-Adjusted Business-As-Usual Emissions Forecasts (2016-2050) ($MTCO_2e$/year)

Activity	2016	2020	2030	2035	2050
Total Solid Waste Emissions	40,038	34,182	37,501	39,356	45,491

Notes: Totals may not add due to rounding.
$MTCO_2e$ = metric tons of carbon dioxide equivalent.
Source: Data compiled by Ascent Environmental in 2019.

2.1.5 Transportation

ON-ROAD VEHICLES

Between 2016 and 2035, GHG emissions from on-road vehicles would increase by approximately 14 percent from 679,920 to 585,860 $MTCO_2e$ per year, accounting for an increase in total VMT of 33 percent, and future vehicle emission factors modeled in the California Air Resources Board's (CARB's) Emission Factor (EMFAC) 2017 model. With respect to the legislative adjustments included in this forecast, State and federal policies and associated regulations incorporated in the on-road vehicle sector include the Pavley Clean Car Standards, Advanced Clean Car Standards, and fuel efficiency standards for medium- and heavy-duty vehicles. These standards are included in EMFAC's emission factor estimates and forecasts. The Low Carbon Fuel Standard was excluded in EMFAC 2017 forecasts because most of the emission benefits originate from upstream fuel production and do not directly reduce emissions in the City's GHG inventory or forecasts. Table 14 summarizes the legislative reductions used to forecast on-road vehicle emissions.

Table 14 On-Road Vehicles Forecast Methods and Legislative Reductions by Source

Source	Forecast Methods	
	Scale Factor	Applied Legislative Reductions
On-Road Vehicles	VMT estimates provided by VRPA.	EMFAC emission factor considerations include ACC, Pavley, and fuel efficiency standards for medium- and heavy-duty vehicles.

Notes: VMT = vehicle miles traveled; EMFAC = California Air Resources Board's EMisson FACtor model; ACC = Advanced Clean Cars; Pavley = Pavley Clean Car Standards.

Source: Ascent Environmental 2019.

Table 15 shows the baseline and legislative-adjusted BAU forecasted emissions from on-road vehicles for 2016, 2020, 2030, 2035, and 2050.

Table 15 On-Road Vehicles Legislative-Adjusted Business-As-Usual Emissions Forecasts (2016-2050) ($MTCO_2e$/year)

Source	2016	2020	2030	2035	2050
On-Road Vehicles	679,920	669,154	592,254	585,860	591,645

Notes: $MTCO_2e$ = metric tons of carbon dioxide equivalent.
Source: Data compiled by Ascent Environmental in 2019.

OFF-ROAD VEHICLES

Between 2016 and 2035, emissions associated with off-road vehicles used in the city would increase by 43 percent from 11,741 to 16,755 $MTCO_2e$ per year. Table 16 shows the baseline and legislative-adjusted BAU forecasted emissions from the off-road vehicle sector for 2016, 2020, 2030, 2035, and 2050.

Table 16 Off-Road Vehicles Legislative-Adjusted Business-As-Usual Emissions Forecasts (2016-2050) ($MTCO_2e$/year)

Source	2016	2020	2030	2035	2050
Off-Road Vehicles	11,741	12,580	15,237	16,755	19,781

Notes: $MTCO_2e$ = metric tons of carbon dioxide equivalent.
Source: Data compiled by Ascent Environmental in 2019.

2.1.6 Discussion

As discussed above and shown in Figure 1 and Table 5, the City's legislative-adjusted BAU emissions would decrease by two percent between 2016 and 2020. This is a result of anticipated growth, despite reductions that would result from the following:

- A greater renewable mix in California's electricity supply (33 percent by 2020);
- Building energy efficiency through compliance with 2019 Title 24 standards (53 percent energy reduction for residential, 30 percent for non-residential);
- Water consumption reduction of 20 percent by 2020 through compliance with SBX7-7;
- Reductions in on-road vehicle emission factors forecasted in EMFAC 2017; and
- Achieving the waste diversion goal of 75 percent, pursuant to AB 341.

From 2020 to 2035, the City's legislative-adjusted BAU emissions would decrease by 3 percent. This is a result of anticipated growth, despite reductions that would result from the following:

- A greater renewable mix in California's electricity supply (60 percent by 2030);
- Building energy efficiency through compliance with 2019 Title 24 standards (53 percent energy reduction for residential, 30 percent for non-residential);
- Water consumption reduction of 20 percent by 2020 through compliance with SBX7-7;
- Reductions in on-road vehicle emission factors forecasted in EMFAC 2017; and
- Maintaining waste diversion goal of 75 percent, pursuant to AB 341.

From 2030 to 2050, new or updated legislative actions that might be put into place by the State or federal government are not known at this time. Thus, the City's projected growth would outpace reductions from existing legislative actions. The main legislative reductions beyond 2030 known at this time would come from SB 100's target of 100 percent of electricity from renewable or zero-carbon sources by 2045 for all electricity providers. Other minor additional reductions would be in forecasted improvements in vehicle fuel economy and increased VMT share of EVs (3.3 percent of vehicles in Riverside County by 2050), as estimated in the EMFAC 2017 model. Existing legislative actions that reduce emissions are assumed to continue to apply from 2030 to 2050 but would not outpace projected growth in population and jobs in that timeframe.

3 GREENHOUSE GAS EMISSION REDUCTION TARGETS

3.1 REDUCTION TARGETS

As directed in AB 32, SB 32, EO B-30-15, EO S-3-05, and CARB's 2017 Climate Change Scoping Plan (Scoping Plan), the State aims to reduce statewide annual GHG emissions to:

- 1990 levels by 2020 (per AB 32);
- 40 percent below 1990 levels by 2030 (per SB 32 and EO B-30-15); and
- 80 percent below 1990 levels by 2050 (per EO S-3-05).

Because the necessary data are not available to estimate the City's 1990 emission levels, proportional targets for the CAP Update were developed that express the level of GHG emissions reductions that would be needed locally between 2016 and future target years to demonstrate consistency with statewide targets. As stated above, CARB aims to reduce statewide emissions to 1990 levels by 2020, 40 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050, per AB 32, SB 32, and EO B-30-15. However, without a 1990 baseline for the City, the State's targets are translated to be in relation to the State's 2016 emission inventory. This inventory update for 2016 was undertaken due to the availability of higher quality data and the evolution of data collection and emissions quantification methods.

CARB's *2017 Climate Change Scoping Plan* recommends that to be consistent with this statewide goal, local jurisdictions should emit no more than 6 MT CO_2e per capita by 2030 and 2 MT CO_2e per capita by 2050. According to CARB, these per-capita targets are consistent with the State's GHG reduction goals because, when applied to DOF's population forecasts for the state, the per-capita targets reflect a 40 percent reduction in statewide emissions from 1990 levels by 2030 and an 80 percent reduction in statewide emissions from 1990 levels by 2050. These targets are equivalent to the state emitting no more than 265 million MT CO_2e by 2030 and 100 million MT CO_2e by 2050.

According to the inventories available from CARB, Statewide emissions from all sectors were approximately 431 million MTCO2e (MMTCO2e) in 1990 and 429 MMTCO2e in 2016 (CARB 2018). Thus, 2016 Statewide emissions were 2 MMTCO2e (0.37 percent) less than the 1990 level and the State's 2020 GHG target. Consequently, no further reductions from 2016 emissions levels are needed to reach the 2020 target of returning emissions to 1990 levels. Because 2016 emissions are essentially equal to the 1990 emissions level, reduction percentages from 2016 levels needed to meet the State's 2030 and 2050 goals are equivalent to the reductions percentages when measured against 1990 levels: 40 percent by 2030 and 80 percent by 2050. Thus, the post-2020 target for the City that is consistent with the State's goals would be to reduce the City's emissions by 40 percent below 2016 levels by 2030 and 80 percent below 2016 levels by 2050. A 2035 target would be established based on interpolation of the 2030 and 2050 targets.

In order to stay consistent with the State's targets and to account for the City's 2016 inventory, the City's percent-based GHG reduction targets are matched with the state-level reduction targets relative to a 2016 baseline. The GHG emissions reduction targets for the City have been developed using the methodology explained above and shown in Table 17.

The following recommended GHG reduction targets would reduce the City's annual GHG emissions consistent with the State's GHG reduction targets:

- 2020 target: no reductions required;
- 2030 target: 40 percent below 2016 levels (542,686 MTCO2e);
- 2035 target: 50 percent below 2016 levels (452,238 MTCO2e); and
- 2050 target: 80 percent below 2016 levels (180,895 MTCO2e).

Table 17 City of Murrieta Emissions Forecasts and Targets (MT CO_2e/yr)

	2016	2020	2030	2035	2050
BAU Forecast	900,280	900,280	963,647	1,133,343	1,573,729
Percent Change from 2016		7%	26%	36%	75%
ABAU Forecast	900,280	900,280	878,357	815,174	875,589
Percent Change from 2016		N/A	-9%	-9%	-3%
State Reduction Target (percent change from 2016)		-2%[1]	40%	50%	80%
Target Emissions		N/A	542,686	452,238[2]	180,895
Reductions Needed from ABAU Forecast		3,917	272,488	368,549	694,694

Notes: ABAU = legislative-adjusted business-as-usual, BAU = business-as-usual, CO_2e = carbon dioxide equivalents, N/A = Not Available, MT = metric tons

[1] Based on the State's GHG inventory in 1990 and 2016. (CARB 2018).

[2] Interpolated between 2030 and 2050.

Source: Ascent Environmental 2019.

Figure 2 depicts the baseline and legislative-adjusted BAU GHG emission forecasts by sector, as distinguished by colored wedges. The sum of the wedges represents anticipated annual GHG emissions each year. Each wedge shows how an emissions sector is expected to contribute to the City's annual inventory over time. The black line indicates the recommended GHG reduction targets for 2030, 2035 and the longer-term goal for 2050. The additional reductions needed to meet these target to close the expected "gap" between the expected ABAU emission levels and the recommended targets are also apparent in Figure 2. While advances in new technologies and new State policy strategies may allow for additional reductions in the future, legislative reductions that may occur past 2030 are currently unknown. Additionally, many of the State's strategies outlined in the 2017 Scoping Plan either have not yet been implemented or sufficient detail regarding the timing and estimated effectiveness of implementation is not yet available.

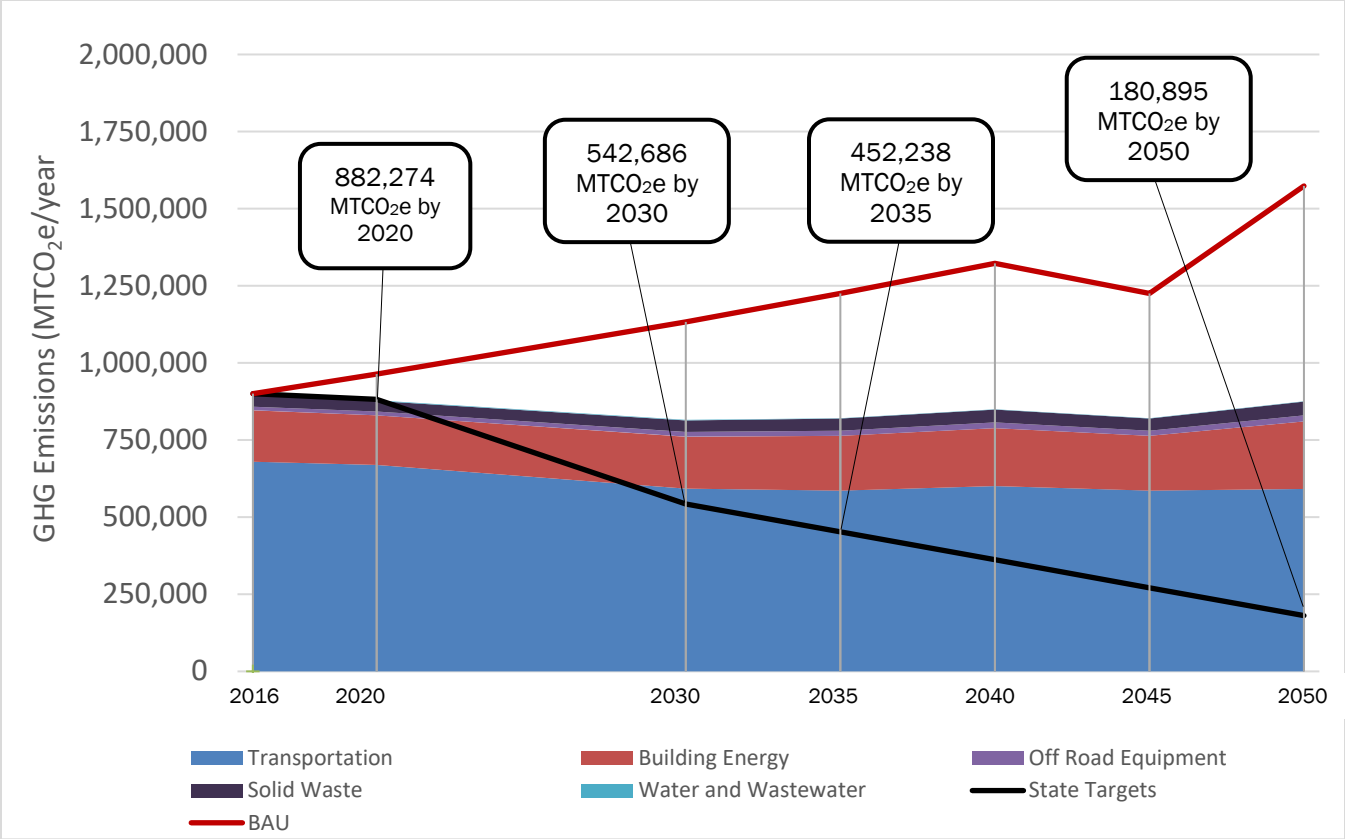


Figure 2 Legislative-Adjusted Business-As-Usual Forecast Emissions by Sector and Recommended Emission Reduction Targets: 2030, 2035, and 2050

A recent California Appellate Court decision, Cleveland National Forest Foundation v. San Diego Association of Governments (November 24, 2014) 231 Cal.App.4th 1056, examined whether EO S-3-05 should be viewed as having the equivalent force of a legislative mandate for specific emissions reductions. The case was reviewed by the California Supreme Court in January 2017 and a decision was released on July 13, 2017. The California Supreme Court ruled that SANDAG did not abuse its discretion by declining to adopt EO S-3-05 as a measure of significance for the specific GHG reduction target years, especially in analyzing the significance of impacts in 2050. Despite this, the California Supreme Court cautioned that future analyses may have a greater capacity to analyze impacts through 2050 and would be required to perform those analyses if that capacity is achievable. Thus, in addition to the other emission reduction targets set in the CAP, the CAP may include analysis of longer-term trends in view of the State's longer-term 2050 goal, as 2050 goals were established in EOs B-30-15 and S-3-05 and referenced in the 2017 Scoping Plan (CARB 2017:99).

4 NEXT STEPS: GHG REDUCTION MEASURES AND GAP ANALYSIS

GREENHOUSE GAS EMISSIONS REDUCTIONS

As discussed in Section 3, while legislative reductions would reduce future emissions and achieve the 2020 GHG reduction target, additional GHG reductions are needed to achieve the recommended GHG reduction targets and goals for 2030, 2035, and 2050.

The 2017 Scoping Plan relies on local action to help achieve statewide GHG reduction targets. As stated in the Scoping Plan, "local efforts can deliver substantial additional GHG and criteria emissions reductions beyond what State policy alone can do, and these efforts will sometimes be more cost-effective and provide more co-benefits than relying exclusively on top-down statewide regulations to achieve the State's climate stabilization goals" (CARB 2017:97). As shown in Table 17 and Figure 2, while the City will not need to reduce emissions to achieve the 2020 target, the GHG reductions required to meet the later targets will require a set of reduction measures with a particular focus on the larger emissions sectors of on-road transportation and building energy.

Next steps in the climate action planning process include (1) working with the City to decide which targets to include in the CAP and (2) developing a set of GHG reduction measures to be included in the CAP that can effectively reduce GHG emissions from the various sectors to achieve the targets established for the CAP.

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CARB. *See* California Air Resources Board.

CEC. *See* California Energy Commission.

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APPENDIX B
Final Technical Memorandum: Gap Analysis and Greenhouse Gas Reduction Measure Calculations

Memo

1230 Columbia Street, Suite 440
San Diego, CA 92101
619.219-8000

Date: November 1, 2019

To: Jarrett Ramaiya and Carl Stiehl, City of Murrieta

From: Kai Lord-Farmer and Poonam Boparai

Subject: City of Murrieta Climate Action Plan Update – Updated Gap Analysis

INTRODUCTION

This memo provides an analysis of annual GHG reductions that would be achieved through the list of Climate Action Plan (CAP) measures that have been discussed with City of Murrieta staff. Table 1 includes a summary of the total GHG reductions achieved through the measures, the proportion of the GHG reduction gap being met by these measures, and additional GHG reductions needed to achieve citywide targets consistent with the State's GHG reduction goals for 2030 and 2050. Table 2 includes the list of GHG reduction measures as well as the GHG reduction potential of each measure for the years 2030, 2035 (General Plan buildout year), and 2050. Table 3 describes the assumptions used to quantify each measure and includes target performance metrics that must be achieved to reduce GHG emissions in line with the City's 2030 and 2035 targets. Many of the performance metrics increase between 2030 and 2035 to achieve the City's 2035 target.

The memo serves as the final analysis of the GHG reduction potential of the list of CAP measures to achieve the City's 2030 and 2035 targets. As shown in Table 1, the City's GHG emissions targets would be achieved for 2030 and 2035 through the set of measures developed for the CAP. The CAP measures work to achieve the reductions necessary to meet the 2030 and 2035 targets while making progress towards the 2050 target. Over the coming decades, new innovations and technologies are anticipated to become available that will enable further GHG reductions and make additional progress towards the 2050 GHG reduction goal. New methods may also become available to quantify measures that are currently unquantifiable. In addition, future federal and State regulations could further reduce emissions in sectors currently addressed primarily by local City measures.

Table 1 City of Murrieta CAP GHG Reduction Gap Analysis (MT CO_2e)

Metric	2030	2035	2050
BAU Forecast	1,133,343	1,225,130	1,573,729
Total ABAU Forecast	815,174	820,787	875,589
City Emissions Targets to achieve consistency with State Targets	542,686	452,238	180,895
Mass Emissions Reduction Target	272,488	368,549	694,694
Total Reductions from Measures	273,748	377,521	542,447
Remaining GHG Reduction Gap	(1,260)	(8,972)	152,246
Percentage of gap achieved through Measures	100%	102%	78%

Notes: Totals may not add due to rounding.
BAU = Business-as-Usual
ABAU = Adjusted-Business-as-Usual
$MTCO_2e$ = metric tons of carbon dioxide equivalent.
Source: Data compiled by Ascent Environmental in 2019.

Table 2 City of Murrieta CAP GHG Reduction Measures

Measure #	Sector	Measure Title	Description	GHG Reductions (MT CO_2e/yr)		
				2030	2035	2050
BE-1	Building Energy	Community Renewable Energy	The City shall create or join a Community Choice Aggregation (CCA) program or create a partnership with SoCal Edison's off-site renewable energy programs (i.e., Green Rate Program), which allows building renters and owners to opt into cleaner electricity sources.	28,306	22,210	0
BE-2	Building Energy	Municipal Renewable Energy	Develop renewable energy generation systems on City-owned property for use in municipal operations.	26	39	0
BE-3	Building Energy	Zero Net Energy Standard	Phase in Zero Net Energy Standard for residential developments by 2030 and nonresidential development by 2035 - Develop and adopt a Zero Net Energy Standard for residential and nonresidential development by 2025 - Begin phase-in of standard beginning in 2025 with standard applying to residential land uses and large nonresidential projects - Fully phase in Zero Net Energy Standard by 2030, requiring all new residential and commercial projects to comply with Zero Net Energy Standard - Fully phase in Zero Net Energy Standard by 2035, requiring all new industrial projects to comply with Zero Net Energy Standard	24,659	50,094	113,303
BE-4	Building Energy	Energy Efficiency and Electrification Program	Work with WRCOG's Western Riverside Energy Partnership to develop and implement a comprehensive electrification and energy efficiency retrofit program focused on the reduction of natural gas use in existing residential and commercial land uses. The program would include the goal of reducing natural gas in existing residential and nonresidential land uses 20% by 2030. - The program would include but not limited to strategies focused on reductions from: o Pool-related energy use (e.g., pool cover rebate program) o Electrification retrofits for natural gas appliances in existing residential and commercial land uses (i.e., hot water heaters, cooktops, heating systems)	33,664	50,800	79,757
LU-1	Land Use	Jobs-Housing Balance Strategy	Encourage flexibility in land use regulations to respond to requirements of new and emerging business and industry types to help create sustainable jobs-housing balance.	10,373	10,418	12,261
LU-2	Land Use	Tree Planting Program	Develop a tree planting program to plant trees throughout the City to increase carbon sequestration.	6,301	12,956	19,612
LU-3	Land Use	Open Space Conservation	Work with the Western Riverside Regional Conservation Authority (RCA) and the Center for Natural Lands Management to implement land use conservation programs for the City. The program would include a minimum acreage of land preserved through conservation easements and, therefore, would not be permitted for future development.	16,095	18,240	20,385

T-1	Transportation	EV Programs	Increase electric vehicles and alternative fuel vehicles to 21% of the City's vehicle mix by 2030 and 23% by 2035 by incentivizing EV purchases and promoting EV ownership for residents and businesses.	82,205	87,335	120,574
T-2	Transportation	EV Programs	Adopt an electric vehicle (EV) charging station ordinance that requires the following for new development: - Installation of one EV charger per single-family housing unit; and - Six percent of total parking spaces require EV charger infrastructure installation for new multi-family projects - Three percent of total parking spaces require EV charger installation for new nonresidential projects	See T-1	See T-1	See T-1
T-3	Transportation	TOD Affordable Housing Program	Prioritize mixed-use and transit-oriented affordable housing projects to achieve the City's affordable housing targets in the SCAG Regional Housing Needs Assessment.	5,036	5,572	7,670
T-4	Transportation	Murrieta Bike Network	Increase the City's bike and pedestrian infrastructure, including implementing the Downtown Murrieta Bike Network, developing comprehensive bike parking standards, and increasing the total percentage of City streets that include bike lanes throughout the City.	367	120	0
T-5	Transportation	Traffic Signalization	Improve traffic flow and reduce traffic congestion by implementing a comprehensive traffic signalization synchronization and update.	1,213	1,265	1,500
T-6	Transportation	Traffic Calming Program	Implement a traffic calming measure program to increase the percentage of City streets and intersections with calming traffic measures.	890	929	3,306
T-7	Transportation	Transportation Demand Management Program	Implement a Citywide TDM Program to reduce communitywide VMT 1. Update Development Code to require employers with 50 or more employees to implement commute trip reduction programs. Commute Trip Reduction Programs voluntary for employees include: - Alternative modes of commuting incentive program (e.g., walking, biking, etc.); - Ride-sharing and preferential parking; - Discounted transit fee program; or - Telecommuting or alternative work schedules 2. Implement a comprehensive ridesharing program targeted at residents working in neighboring cities and long-distance commuters (i.e., San Diego, Los Angeles). 3. Monitor progress annually on TDM program to measure progress towards achieving a nine percent reduction in VMT by 2030 and an 11 percent reduction by 2035.	8,954	11,416	18,373
T-8	Transportation	Transit Network	Work with RTA and WRCOG to expand the transit network in the City and increase service frequency with a priority on expanding services to neighboring cities where Murrieta residents work.	8,659	21,555	25,145
T-9	Transportation	GHG Fee Program	Develop and implement a no-net-increase in GHG emissions threshold for new development projects in the City and develop a GHG Fee Program to offset remaining GHG emissions from new development that cannot	41,357	76,481	108,756

			be achieved through project design features or other CAP measures. As part of implementation of this measure, the City shall: - Adopt a set of strategies to reduce GHG emissions from new development through project-specific mitigation measures (See Implementation Descriptions below for suggestion of potential strategies.) - Develop a process in which the remainder of emissions that cannot be reduced through project-specific measures shall be quantified and offset through a combination of a local emissions offset program to be set up by the City and other offset registry programs(See Implementation Descriptions below for a description of the local emissions offset program.)			
SW-1	Solid Waste	Waste Reduction Program	Encourage recycling or the re-use of materials to reduce the amount of solid waste generated within the City with the goal of achieving a 90% waste diversion rate by 2035.	4,583	7,215	11,120
SW-2	Solid Waste	Construction Waste Diversion	Require all construction projects to exceed CalGreen construction waste diversion requirements by 15 percent.	998	827	686
WW-1	Water	Landscaping and Water Conservation Program	Reduce outdoor water use by 10% at residential, commercial, and public properties by installing efficient irrigation systems and plants with lower watering needs.	55	44	0
WW-2	Water	Rainwater Catchment Program	Encourage property owners to recycle water with rainwater catchment and greywater systems in existing and new developments.	5	4	0

Notes: $MTCO_2e$ = metric tons of carbon dioxide equivalent.
Source: Ascent Environmental 2019.

Table 3 City of Murrieta CAP GHG Reduction Measure Assumptions and Target Metrics

Measure #	Sector	Measure Title	Metric Assumptions	Metric Unit	Measure Target Metrics		
					2030	2035	2050
BE-1	Building Energy	Community Renewable Energy	This measure assumes that the City of Murrieta joins the Western Community Energy. Based on estimates from the CCA feasibility study conducted for Western Community Energy, the measure assumes that 95% of existing and new residential customers opt-in to the CCA and 90% of existing and new nonresidential uses opt-in to the CCA. The measure assumes that customers that do opt-in choose the 100% renewable energy option. Based on other CCAs in California, this is a conservative opt-in rate.	kWh purchased under CCA	468,029,462	478,212,825	555,867,016
				Residential Opt-In Rate	95%	95%	95%
				Nonresidential Opt-In Rate	90%	90%	90%

				Assumed renewable energy mix for CCA customers	100%	100%	100%
BE-2	Building Energy	Municipal Renewable Energy	The measure assumes that the City begins to develop photovoltaic systems on City buildings and property over the next ten years and beyond. The measure assumes that the City offsets 100% of its GHG emissions associated with electricity by 2035 through a combination of on-site solar systems and participation in the CCA.	kWh generated from City Solar Systems	410,289	820,577	820,577
BE-3	Building Energy	Zero Net Energy Standard	This measure assumes that the City begins to develop a Zero Net Energy standard, which is finalized and adopted by 2025. The measure assumes that 75% of residential units and 65% of commercial square footage developed between 2020 and 2030 would comply with the ZNE standard. The measure assumes that 100% of residential units, 100% of commercial projects, and 50% of industrial projects developed between 2030 and 2035 would comply with the ZNE standard beyond 2030, and 100% of industrial projects would comply with the ZNE standard by 2035.	Consumption avoided through ZNE Standard (kWh)	51,356,672	92,086,377	191,901,119
				Consumption avoided through ZNE Standard (Therms)	3,179,444	6,858,463	16,713,800
				New residential units using ZNE Standard	75%	100%	100%
				New commercial sq. ft. developed using ZNE Standard	65%	100%	100%
				New industrial Sq. Ft. developed using ZNE Standard	50%	50%	100%
BE-4	Building Energy	Energy Efficiency and Electrification Program	This measure assumes that the City will develop and implement a comprehensive energy efficiency retrofit and appliance electrification program, focused on reducing natural gas use in existing land uses through appliance upgrades, weatherization upgrades, and other energy efficiency measures.	Percent reduction in natural gas use in existing residential, commercial, and industrial land uses	20%	25%	25%
LU-1	Land Use	Jobs-Housing Balance Strategy	This measure assumes the number of jobs within the City and within a 30-mile radius of the City increases in the future and therefore results in commute-related VMT reductions for residents.	Percent increase in jobs available within a 30-mile radius	30%	35%	35%
LU-2	Land Use	Tree Planting Program	This measure assumes the City develops a program to plant trees for carbon sequestration and other co-benefits, planting an assumed average number of trees per year.	Average number of trees planted per year	750	800	800
LU-2	Land Use	Open Space Conservation	This measure assumes that a certain number of acres in the City limits is preserved as open space resulting in carbon sequestration. The measure assumes that this land would otherwise be cleared for development and, if done, would result in a net decrease in sequestration potential.	Number of acres preserved	200	150	150

T-1	Transportation	EV Programs	This measure assumes that through the City's efforts to incentivize EV adoption among residents, the percentage of EV and Zero Emissions Vehicles (ZEVs) increase in the City to above levels that are already projected to occur under a ABAU scenario.	Percentage of citywide vehicle mix that are EVs or ZEVs	21%	23%	31%
T-2	Transportation	EV Programs	This measure assumes that the City will adopt an ordinance that requires new development to have a certain level of EV infrastructure in place as part of the project. The reductions achieved from this measure is combined with T-1.	Percent of new SFU with charging stations	100%	100%	100%
				Percent of new MFU parking spaces with charging stations	6%	6%	6%
				Percent of parking spaces in nonresidential land uses with charging stations	3%	3%	3%
T-3	Transportation	TOD Affordable Housing Program Murrieta Bike Network Traffic Signalization	This measure assumes that the City focuses on developing mixed-use, transit-oriented affordable housing projects in the future. The measure assumes that the City locates these projects in areas that encourage trips made by walking, biking, and transit and keeps pace with City's Regional Housing Needs Assessment goals for affordable housing units in the City.	Number of transit-oriented affordable housing units built	1,573	787	2,360
T-4	Transportation	Murrieta Bike Network	This measure assumes that the City continues to develop the City's bike network, and the percentage of streets in Murrieta with bike lanes continues to increase over time.	Percent of citywide street length with bike lanes	19%	38%	51%
T-5	Transportation	Traffic Signalization	This measure assumes the City conducts a comprehensive upgrade of the traffic signal system to improve traffic flow and relieve traffic congestion, particularly during periods of commute congestion periods. This measure assumes that fuel consumption associated with commute-related VMT in the City will decrease by 9% as a result of improving traffic signalization.	Transportation fuel reduced by improving traffic signalization (Gallons of Gasoline)	138,146	144,091	170,831
T-6	Transportation	Traffic Calming Program	This measure assumes that the City continues to implement traffic calming measures on City streets and intersections to reduce traffic speeds and reduce cut-through traffic and assumes a certain percentage of streets and intersections will include traffic calming measures by a certain year.	Percent of intersections with traffic calming improvements	25%	25%	50%
				Percent of streets with traffic calming improvements	25%	50%	50%

T-7	Transportation	Transportation Demand Management Program	This measure assumes that the City implements a comprehensive TDM program that requires new large employers to offer TDM options and incentives to employees as well as providing commute services and support (e.g., rideshare, telework) for residents who work outside the City. The measure assumes a certain percentage of commute-related VMT reduction by target years.	Percent of commute-related VMT reduced	9%	11%	15%
T-8	Transportation	Transit Network	This measure assumes that the City works with RTA and other regional partners to expand the transit network in the City and increase the frequency of service of existing transit services.	Percent reduction in citywide VMT	2.5%	6%	6%
T-9	Transportation	GHG Fee Program	This measure assumes the City develops, as part of the City's forthcoming CAP Consistency checklist or other development review process, a program to reduce and offset GHG emissions associated with new development projects. The measure assumes emissions reductions and offsets can be tracked and quantified to ensure compliance with the measure.	Percent of project emissions reduce through program	50%	50%	50%
SW-1	Solid Waste	Waste Diversion	This measure assumes that the City works to meet the waste diversion targets set by CalRecycle for specific target years. The reductions associated with this measure have been included in the ABAU forecast as part of the legislative reductions.	Percent of waste diverted from landfills	85%	90%	95%
SW-2	Solid Waste	Construction Waste Diversion	This measure assumes that the City implements a policy, as part of the City's forthcoming CAP Consistency checklist or other development review process, to require all construction projects to exceed CalGreen construction waste diversion requirements by 15 percent.	Percent of construction waste	65%	65%	65%
WW-1	Water	Landscaping and Water Conservation Program	This measure assumes that City implements a policy to reduce outdoor water use from various land uses by installing efficient irrigation systems, using plants with lower watering needs, and promoting water conservation. The measure assumes that Citywide water use is reduced by a certain percent by target years.	Percent reduction in citywide water use	10%	10%	10%
WW-2	Water	Rainwater Catchment Program	This measure assumes that the City develops and implements a program to increase recycled water use by residents through the use of with rainwater catchment and greywater systems in existing and new developments	Percent reduction in citywide water use	1%	1%	1%

Notes: $MTCO_2e$ = metric tons of carbon dioxide equivalent.
kWh = kilowatt-hour; VMT= vehicle miles traveled
SFU= single-family unit; MFU= multi-family unit
Source: Ascent Environmental 2019.

IMPLEMENTATION DESCRIPTIONS FOR KEY MEASURES

The following section includes a description of how key CAP measures would be implemented and specific steps that should be taken to successfully implement the measure.

BE-1 - COMMUNITY RENEWABLE ENERGY

The Western Community Energy Program (WCE) is a program established in 2018 to implement a Community Choice Aggregation (CCA) program for jurisdictions in western Riverside County. WCE's primary objectives are to provide local control in rate-setting for customers, provide overall rates that are lower and/or competitive with those offered by SCE, expanded options for economic development, and supply an energy portfolio that will use local and/or regional renewable resources. During Phase 1, beginning in 2020, WCE anticipates serving approximately 114,000 out of 120,500 residential and nonresidential accounts. Alongside serving as an energy provider, WCE also intends to develop an energy program to provide support for WCE customers conducting energy efficiency and renewable energy-related projects. It is anticipated that these programs could help in the implementation of other CAP measures (BE-4). Details regarding the development, governance, and operations of WCE can be found here in the Western Community Energy Implementation Plan.

Implementation Items

- Research existing CCA programs in California to understand how the programs operate and what success they have achieved.
- Work in collaboration with WRCOG and WCE to discuss the details and requirements in joining WCE, including the potential need for a feasibility study, costs and timeline for, and anticipated rates.
- Explore developing an alternative program with SCE to increase the purchase of renewable energy by residents and businesses that can achieve the GHG reductions quantified for the measure (BE-1).

BE-2 - MUNICIPAL RENEWABLE ENERGY

Through this measure, the City has the opportunity to demonstrate leadership by developing renewable energy systems for municipal operations. By increasing the City's renewable energy generation, the City can achieve long-term cost savings and increase the resilience of the City's municipal energy supply during power outages. WRCOG's Energy Department offers support, services, and access to financing for local jurisdictions who are conducting energy efficiency and renewable energy projects at municipal facilities.

Implementation Items

- Conduct audits at municipal facilities to quantify energy use and to identify and quantify energy efficiency and conservation opportunities.
- Based on energy audits, develop a list of energy efficiency and renewable energy projects the could be implemented as well as an implementation plan and timeline for the development of the projects.
- Identify grants, rebate and incentive programs (WRCOG program), and financing opportunities for municipal energy efficiency and renewable energy.

BE-3 - ZERO NET ENERGY STANDARD

This measure focuses on developing a Zero Net Energy (ZNE) Standard for new residential and nonresidential projects in the City, with requirements phased in over time between 2020 and 2030. Beginning in approximately 2013, the California Energy Commission and California Public Utilities

Commission begun discussions of phasing in a ZNE standard for new construction in California. Since then, the State has been taking significant steps to phase in a standard, including the development of California's Zero Net Energy Action Plan and, most recently, the 2019 Energy Efficiency Standard Update, which requires solar installations for all single-family and low-rise multi-family homes. This measure is intended to help the City keep pace as the State moves closer to a ZNE standard for all new development and get ahead of the curve of anticipated changes to come.

Implementation Items

- Research California's Zero Net Energy Action Plan and other ZNE resources, including other ZNE standards that have been adopted by California cities (e.g., San Jose).
- Identify potential funding opportunities, technical support, resources in helping to develop a ZNE standard for both residential and nonresidential uses.
- Develop ZNE standard and detailed timeline for implementation of the standard for different land uses.
- Identify forthcoming residential development projects that could potentially serve as a case study for early adoption of the City's ZNE standard

BE-4 - ENERGY EFFICIENCY AND ELECTRIFICATION PROGRAM

This measure focuses on developing a comprehensive electrification and energy efficiency retrofit program focused on the reduction of natural gas use in existing residential and commercial land uses. The program would include multiple components, in collaboration with regional partners, focusing on various aspects of energy conservation, energy efficiency, and building electrification. These programs would likely include:

- An energy conservation marketing campaign to achieve energy cost savings through conservation practices and tools to help monitor and lower energy use.
- An energy efficiency assessment and retrofit program to help residents and businesses assess energy efficiency opportunities and incentives for energy efficiency upgrades.
- An appliance retrofit program focused on upgrading to all-electric appliances in existing buildings (i.e., water heaters, cooktops, heating systems, pool heating systems) but would also include energy efficient electric appliances (e.g., refrigerators, televisions).

Implementation Items

- Work with WRCOG and WCE to discuss opportunities for collaboration and support in implementing the City's Energy Efficiency and Electrification Program including opportunities to share data and resources.
- Conduct research regarding the implementation of similar programs in other California cities and agencies. Develop an implementation timeline and plan for the development of the program with assistance from WRCOG and WCE when appropriate.
- Develop Energy Efficiency and Electrification Program and set internal targets for energy reductions that are consistent with the estimate used to quantify this measure.

LU-1 - JOBS-HOUSING BALANCE STRATEGY

This measure is intended to support the City in achieving a sustainable jobs-housing balance by implementing strategies to attract new employers to the City and the surrounding region and, as a result, reducing commute related VMT for residents and improving quality of life. This measure requires that the City exercise flexibility in land use regulations to respond to requirements of new and emerging business and

industry types as well as ensuring the regulatory environment in the City remains attractive to large employers looking to locate in the City.

Implementation Items

- Research strategies to update the City's development code to ensure flexibility in building standards when working with large employers who are considering locating in the City.
- Work with WRCOG, SCAG, and the Murrieta Chamber of Commerce to understand the growth population and employment characteristics in the region and opportunities to create a sustainable jobs-housing balance for residents.
- Adjust the development code and long-term nonresidential land use development strategy in the City to ensure the City is taking advantage of regional growth opportunities in key employment sectors and industries.

T-1 AND T-2 – ELECTRIC VEHICLE PROGRAMS

This measure is focused on increasing the number of EVs and ZEVs to achieve a higher percentage of vehicles in the City being EVs and ZEVs than what is currently projected for Riverside County. The City can provide an environment conducive to EV adoption and help remove barriers to help increase EV adoption rates. T-1 focuses on promoting and increasing EV ownership in the City and would include several components that would together create a comprehensive program. The program would include:

- An educational component to conduct outreach and educate residents about the benefits of EV ownership
- A marketing component to educate residents on current incentives and rebates available for purchasing an EV and installing residential EV Charging equipment
- Updates to the City's development code to incentivize the installation of EV chargers in new and existing land uses
- An incentive program for the purchase of EVs and ZEVs for City residents potentially funded through the GHG Mitigation Fee Program (T-9)

T-2 focuses on developing and adapting an EV Infrastructure ordinance to ensure that new development in the City includes adequate equipment EV charging infrastructure to keep pace with the City's increased EV adoption rates.

Implementation Items

- T-1
  - Research other cities and agencies (e.g., Pasadena) that have implemented similar programs in California and adopt components of programs that are appropriate for the development of the City program.
  - Work with Transportation Network Companies (e.g., Uber and Lyft) to promote EV adoption amongst drivers, promoting the benefits of EV's unique to drivers (e.g., lower maintenance costs, lower fuel costs).
  - Work with the South Coast Air Quality Management District, SCAG, and WRCOG to discuss potential opportunities for collaboration in implementing the program. Develop an implementation plan and timeline for implementing the program by 2023.
- T-2
  - Research other jurisdictions which have adopted EV ordinances to increase EV charging infrastructure (e.g., Menlo Park).
  - Develop and adopt an EV ordinance to require appropriate levels of EV charging in new residential and nonresidential uses in the City.

- Promote available incentives for EV charging infrastructure to residents and developers in the City.

T-7 – TRANSPORTATION DEMAND MANAGEMENT PROGRAM

This measure is focused on reducing commute-related VMT generated by new large employers in the City and the region. The measure would build on the City's existing Transportation Demand Management process in place to increase resources and support available to employers to help implement employer base TDM programs and increase resources to City to manage and monitor progress of the TDM Program. Given that the City is focused on attracting new employers to develop a sustainable jobs-housing balance, the TDM measures included in the program would be designed to be conducive to development and attractive to employees to reduce commute costs and time. The TDM measures established as part of the program can be included in the City's CAP Consistency Checklist to effectively streamline this measure into the City's development process for new projects. The TDM Program measures could include, but are not limited to:

- A comprehensive marketing program targeted at employees to promote the benefits (health, cost savings) of low-GHG commute modes (e.g., walking, biking, transit, telecommuting, etc.);
- Requirements for short and long-term bicycle parking facilities including on site-amenities (e.g., showers, locker rooms);
- Incentives for using alternative modes (e.g., transit pass subsidies, carpool, parking cash-out program);
- a vanpool program for residents with longer commutes outside the City;
- A ride-matching and ride-sharing program for both employees working in the City and for residents who commute to regions outside the City (e.g., San Diego, Los Angeles);
- A telecommuting program to promote telecommuting for large employers in the City as well as advocating for telecommuting practices in the larger region with support from WRCOG; and
- A monitoring program to track progress on the VMT reductions achieved through the TDM program.

Implementation Items

- Research other cities and agencies in the region conducting comprehensive TDM Programs and adopt components of programs that are appropriate for development in the City's expanded program.
- Work with WRCOG and other regional partners to discuss potential collaboration in implementation components of the TDM Program.
- Develop TDM Program Implementation Plan and hire a Transportation Demand Management coordinator to implement the TDM Program.
- Adopt a TDM Program ordinance that would apply to specific types of new development in the City and help reduce VMT generate from new projects. This ordinance can be implemented, in part, through the City's CAP Consistency Checklist.

T-9 – GHG MITIGATION FEE PROGRAM FOR NEW DEVELOPMENT

This measure is intended to reduce GHGs from new development in the City, particularly, but not exclusive to, GHG emissions associated with VMT generated by new residential and nonresidential development in the City. As part of the measure, the City would develop a program to mitigate a certain percentage of GHG emissions from new development through a fee-based program that would offset emissions through development of local mitigation projects. The total fee for different new development projects would be calculated based on key characteristics of the project (e.g., land use type, size) to estimate the anticipated GHG emissions of the project, similar to other impact fee programs (e.g., transportation impact fees).

Applicants would then pay into a fee program for the project's GHG emissions that cannot be mitigated through other CAP measures. Mitigation projects funded through the program would give priority to implementing local projects to reduce emissions in the City and then, once local options are exhausted, through a mitigation bank to contribute to larger mitigation projects (e.g., large transit projects). A key next step for the City in implementation of this measure would be to conduct a more in-depth analysis to price the fee appropriately and how the fee program would be structured for successful implementation. Types of mitigation projects to be funded through the program could include:

- Funding of TDM measures which would result in GHG emissions reductions (e.g., transit pass subsidies, car-sharing program)
- Funding of larger transit projects which demonstrate VMT reductions and GHG emissions
- Appliance replacement programs to replace natural gas appliances with electric appliances
- Vehicle replacement programs to incentivize the purchase of EVs and ZEVs for residents and businesses

Implementation Items

- Research VMT Mitigation and Banking Programs including information in UC Berkeley's Technical Report "Implementing SB 743: An Analysis of Vehicle Miles Traveled Banking and Exchange Frameworks" .
- Develop a comprehensive list of strategies, projects, and other opportunities to reduce GHG emissions which can be funded and implemented through the program.
- Choose or design the most appropriate framework for developing a GHG Mitigation Fee Program and incorporate the program into the City's development and environmental review processes.

APPENDIX C
Climate Action Plan Consistency Checklist

Development Services
Planning Division
1 Town Square
Murrieta, CA 92562
951-461-6061
www.murrietaca.gov

CLIMATE ACTION PLAN CONSISTENCY CHECKLIST INTRODUCTION

The City of Murrieta has prepared a Climate Action Plan (CAP) that outlines actions that the City will undertake to achieve its proportional share of State greenhouse gas (GHG) emissions reductions. The purpose of the CAP Consistency Checklist (Checklist) is to, in conjunction with the CAP, provide a streamlined review process for proposed new development projects that are subject to discretionary review and trigger environmental review pursuant to the California Environmental Quality Act (CEQA).

Analysis of GHG emissions and potential climate change impacts from new development is required under CEQA. The CAP is a plan for the reduction of GHG emissions in accordance with CEQA Guidelines Section 15183.5. Pursuant to CEQA Guidelines Sections 15064(h)(3), 15130(d), and 15183(b), a project's incremental contribution to a cumulative GHG emissions effect may be determined not to be cumulatively considerable if it complies with the requirements of the CAP.

This Checklist contains measures that are required to be implemented on a project-by-project basis to ensure that the specified emissions targets identified in the CAP are achieved. Implementation of these measures would ensure that new development is consistent with the CAP's assumptions for relevant CAP strategies toward achieving the identified GHG reduction targets. Projects that are consistent with the CAP as determined through the use of this Checklist may rely on the CAP for the cumulative impacts analysis of GHG emissions. Projects that are not consistent with the CAP must prepare a project-specific analysis of GHG emissions, including quantification of existing and projected GHG emissions and incorporation of the measures in this Checklist to the extent feasible.

The Checklist may be periodically updated to incorporate new GHG reduction techniques, to comply with later amendments to the CAP, or to reflect changes in local, State, or federal laws, regulations, ordinances, and programs.

APPLICATION SUBMITTAL REQUIREMENTS

- The Checklist is required only for projects subject to CEQA review. The diagram below shows the context for the CAP Consistency Checklist within the planning review process framework.
- If required, the Checklist must be included in the project submittal package. Application materials and submittal procedures can be found on the City of Murrieta website here. This checklist is designed to assist the applicant in identifying the minimum CAP-related requirements specific to their project. However, it may be necessary to supplement the completed checklist with supporting materials, calculations or certifications, to demonstrate compliance with CAP requirements.
- The requirements in the Checklist will be included in the project's conditions of approval.
- The applicant must provide an explanation of how the proposed project will implement the requirements described herein to the satisfaction of the Planning Division.
- If a question in the Checklist is deemed not applicable to a project, an explanation must be provided to the satisfaction of the Planning Division.

DRAFT

Application Information

Contact Information

Project No./Name: _____

Property Address/APN: _____

Applicant Name/Co.: _____

Contact Phone: _____ Contact Email: _____

Was a consultant retained to complete this checklist? ☐ Yes ☐ No If Yes, complete the following

Consultant Name: _____ Contact Phone: _____

Company Name: _____ Contact Email: _____

Project Information

1. What is the size of the project (acres)? _____
2. Identify all applicable proposed land uses:
   - ☐ Residential (indicate # of one- and two-family units): _____
   - ☐ Residential (indicate # of multi-family units): _____
   - ☐ Commercial (indicate total square footage):
   - ☐ Hotel (indicate # of rooms): _____
   - ☐ Industrial (indicate total square footage): _____
   - ☐ Other (describe): _____
4. Provide a brief description of the project proposed: _____

_____

_____

_____

CAP CONSISTENCY CHECKLIST QUESTIONS

STEP 1: LAND USE CONSISTENCY

The first step in determining CAP consistency for discretionary development is to assess the project's consistency with the growth projections used in the development of the CAP. This section allows the City to determine a project's consistency with the land use assumptions used in the CAP. Projects found not to be consistent with the CAP's land use assumptions will be subject to a project-specific analysis of GHG emissions' impact on the environment in accordance with the requirements of the CEQA. This may result in GHG-reducing mitigation measures applied as a condition of project approval, including where feasible the measures listed in Step 2 of this checklist.

Step 1: Land Use Consistency		
Checklist Item **(Check the appropriate box and provide explanation and supporting documentation for your answer)**	**Yes**	**No**
1. Are the proposed land uses in the project consistent with the existing General Plan land use and zoning designations? If "Yes", questions 2 below is not applicable and the project shall proceed to Step 2 of the checklist. If "No", proceed to Question 2 below.	☐	☐
2. If the proposed project is not consistent with the General Plan land use or zoning designations, does the project include a land use plan and/or zoning designation amendment that would result in an equivalent or less GHG-intensive project when compared to the existing designations? If "Yes", attach to this checklist the estimated project emissions under both existing and proposed designation(s) for comparison. Compare the maximum buildout of the existing designation and the maximum buildout of the proposed designation. If the proposed project is determined to result in an equivalent or less GHG-intensive project when compared to the existing designations, proceed to Step 2 of the checklist. If "No", the applicant must conduct a full GHG impact analysis for the project as part of the CEQA process. The project shall incorporate each of the applicable measures identified in Section C to mitigate cumulative GHG emissions impacts.	☐	☐

STEP 2: CAP MEASURES CONSISTENCY

The second step of the CAP consistency review is to review and evaluate a project's consistency with the applicable strategies and actions of the CAP. Step 2 only applies to development projects that involve permits that may require a certificate of occupancy from the Building Official.[1] All applicable Checklist questions must be answered "Yes", and documentation provided, where necessary, that substantiates how compliance would be achieved. For measures for which a "Yes" is indicated, the features must be demonstrated as part of the project's design and described. All applicable requirements in the Checklist will be included in the conditions of approval.

If any questions are marked with a "No", the project cannot be determined to be consistent with the CAP, and project specific GHG analysis would be required as part of the CEQA process. If any questions are marked "N/A" (meaning "not applicable"), a statement describing why the question is not applicable shall be provided to the satisfaction of the Planning Division or building official.

Step 2: CAP Strategies Consistency			
Checklist Item (Check the appropriate box and provide explanation for your answer)	Yes	No	N/A
1. Zero Net Energy Standards (Measure BE-3)			
a) For residential projects, would the project or a portion of the project be subject to building permitting (i.e., building permits issued) on or after January 1, 2023? b) For commercial projects or commercial portions of mixed-use projects, would the project or a portion of the project be subject to building permitting (i.e., building permits issued) on or after January 1, 2025? c) For industrial projects, would the project or a portion of the project be subject to building permitting (i.e., building permits issued) on or after January 1, 2025? If "Yes" to either a, b, or c, proceed to question d of this checklist requirement.	☐	☐	☐
d) Would the project or portions of the project permitted after January 1, 2023 for residential projects and after January 1, 2025 for nonresidential projects be designed and constructed to comply with the Zero Net Energy standard[2]?	☐	☐	☐
2. Construction Waste Diversion (Measure SW-2)			
a) For residential projects, recycle and/or salvage for reuse a minimum of 80 percent of the nonhazardous construction and demolition waste in accordance with either Section 4.408.2, 4.408.3 or 4.408.4 of the California Code of Regulations, Title 24? b) For nonresidential projects, recycle and/or salvage for reuse a minimum of 80 percent of the nonhazardous construction and demolition waste in accordance with either Section 5.408.1.1, 5.408.1.2 or 5.408.1.3 of the California Code of Regulations, Title 24?	☐	☐	☐

[1] Actions that are not subject to Step 2 would include, for example: 1) discretionary map actions that do not propose specific development; 2) permits allowing wireless communication facilities; 3) special events permits; 4) conditional use permits that do not result in the use intensification or expansion of an existing building; and 5) non-building infrastructure projects such as roads and pipelines. Because such actions would not result in new occupancy buildings from which GHG emissions reductions could be achieved, the items contained in Step 2 would not be applicable.

[2] Although the City has not yet developed a Zero Net Energy standard, the City will develop such a standard prior to January 1, 2023, pursuant to Measure BE-3 in the CAP. For purposes of CAP compliance, all new residential projects that include phases for which building permitting would begin after January 1, 2023, compliance with zero net energy standard as stated herein must be included as a condition of approval and included as a mitigation measure in the project's environmental document (as applicable). For all new commercial projects, commercial portions of mixed-used projects, and industrial projects that include phases for which building permitting would begin after January 1, 2025, projects must demonstrate compliance with zero net energy standard. Such projects or phases thereof, to meet the zero net energy standard, must achieve a Total Energy Design Rating (Total EDR) and Energy Efficiency Design Rating (Efficiency EDR) of zero, consistent with the standards in Title 24, Part 6 of the California Code of Regulations, by the date established above for each land use type.

Step 2: CAP Strategies Consistency			
Checklist Item **(Check the appropriate box and provide explanation for your answer)**	**Yes**	**No**	**N/A**
3. Transportation Demand Management Program (Measure T-7)			
a) For the construction of nonresidential projects that would include 50 or more employees, would the project include a transportation demand management plan that meets requirements of Section 16.40 "Transportation Demand Management" of the City's Municipal Code has been reviewed and approved by the City of Murrieta Public Works Department? Check "N/A" if the project is a residential project or if it would include 49 or fewer employees.	☐	☐	☐
4. Electric Vehicle Service Equipment (EVSE) (Measure T-2)[3]			
Checklist Requirement by Project Type: a) <u>One- and two-family dwellings and townhouses with attached private garages:</u> Would the required parking serving each new dwelling include Electric Vehicle Service Equipment (EVSE) to allow for electric vehicle charging by the resident(s)? b) <u>Multi-Family Residential Projects:</u> Would 6% of the total parking spaces required, or a minimum of two spaces, whichever is greater, include Electric Vehicle Service Equipment (EVSE) to allow for electric vehicle charging by the resident(s)? c) <u>Non-residential projects</u>: Would 3% of the total parking spaces required, or a minimum of two spaces, whichever is greater, include Electric Vehicle Service Equipment (EVSE) to allow for electric vehicle charging by the resident(s)?	☐	☐	☐

[3] For the purpose of this Checklist, EVSE is defined by Article 625 of the California Electrical Code.

APPENDIX D
Final Technical Memorandum: Climate Change Vulnerability Assessment

Memo

455 Capitol Mall, Suite 300
Sacramento, CA 95814
916.444-7301

Date: September 7, 2018

To: Paul Swancott (City of Murrieta)

From: Ricky Williams, Poonam Boparai, and Honey Walters

Subject: City of Murrieta Climate Action Plan Technical Memorandum: Climate Change Vulnerability Assessment

INTRODUCTION

Climate change is a global phenomenon that has the long-term potential to cause a variety of consequences, including detrimental impacts on human health and safety, economic continuity, water security, provisions of basic services, and economic function (California Natural Resources Agency [CNRA] 2012). The effects of climate change will continue to impact the physical environment throughout California, Riverside County, and the City of Murrieta (City). The magnitude and timing of climate change effects will vary by location; therefore, it is important to identify the projected severity of these impacts specific to the City. The first step in adapting to climate change is to analyze these impacts and the vulnerabilities they create.

In accordance with Senate Bill (SB) 379, this Vulnerability Assessment follows the recommended format and methods described in the most recent Cal-Adapt tool and California Adaption Planning Guide. SB 379 requires that jurisdictions update their safety elements and local hazard mitigation plans, as necessary, to address climate adaption and resiliency strategies. The update is required to include a set of goals, policies, and objectives based on a vulnerability assessment.

CLIMATE CHANGE ADAPTATION PLANNING PROCESS

The California Adaption Planning Guide (APG), developed by California Governor's Office of Emergency Services (Cal OES) and CNRA, helps communities throughout California plan for and adapt to the impacts of climate change. The APG includes a nine-step process, illustrated in Figure 1, which allows communities to assess their specific climate vulnerabilities and provides strategies for communities to reduce climate-related risks and prepare for current and future impacts of climate change.

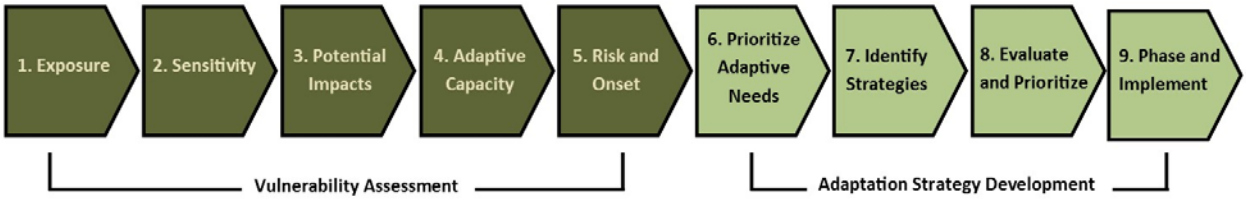

Figure 1: The Nine Steps in the Adaptation Planning Process

The first phase of the nine-step process focuses on preparing a Vulnerability Assessment, which is a method for determining the anticipated impacts of climate change on community assets and populations. This phase evaluates a community's level of exposure to climate-related impacts and analyzes how these impacts will affect a community's populations, functions, and structures. The second phase of the process uses the information gathered in the Vulnerability Assessment to develop adaption strategies and measures to help the community prepare for, respond to, and adapt to local climate change impacts. The strategies support a collaborative planning process that involves a variety of City departments and State agencies, including, but not limited to Cal OES, CNRA, and the California Department of Public Health (CDPH). This memorandum follows APG's nine-step process and includes a Vulnerability Assessment, identifying key climate-related risks faced by the City.

1 VULNERABILITY ASSESSMENT

This Vulnerability Assessment for the City involves the first five steps in the adaption planning process. Based on the work of International Panel on Climate Change (IPCC) and research conducted by the State and partner agencies and organizations, climate change is already affecting the City (as described in the following sections) and will continue to further in the future.

1.1 STEP 1: EXPOSURE

The effects of climate change can be described in terms of primary exposure to various physical changes in the climate and environment caused by global climate change, such as temperature, precipitation, and sea level rise. Secondary consequences, such as reduced water supply, impacts on structures from erosion and sea-level rise, increased frequency and duration of heat waves, and increased fire risk, occur as a result of one or a combination of these primary effects (California Governor's Office of Planning and Research (OPR) 2018).

The impact of climate change in California varies across the state due to diversity in biophysical setting, climate, and jurisdictional characteristics. The Desert Region, as designated by CNRA includes San Bernardino, Riverside, and Imperial Counties. The Cal-Adapt tool, developed by the California Energy Commission (CEC) and University of California (UC) Berkeley is used to project the impacts of climate change at a local and regional level. This tool provides climate change-related projections for a variety of impacts including maximum and minimum temperature and precipitation, extreme heat days and warm nights, snowpack, sea level rise, wildfire risk, and streamflow. These impacts are projected for two scenarios: High-Emissions Scenario, which assumes that emissions will continue to rise through 2050 and plateau in 2100, then decline, and Low-Emissions Scenario, which assumes emissions will peak around 2040, then decline. Because the degree of effectiveness of programs implemented to reduce GHG emissions is not yet known, results from both emissions-scenarios are considered in the Vulnerability Assessment and distinguished, where possible (CEC 2018).

1.1.1 Increased Temperature

Increases in average temperatures can result in multiple negative effects on the built and natural environment. These secondary impacts of increased temperature include increased frequency of extreme heat events and heat waves, and exacerbation of the urban heat island effect. In Riverside County, projected increases in temperatures will be higher further inland and closer to desert regions.

Annual temperatures in the City are projected to increase steadily under both Low- and High-Emissions scenarios. The City's historical average annual maximum and minimum temperatures, based on data from 1950 to 2005, are 79.8 degrees Fahrenheit (°F) and 47.1 °F, respectively. By 2099 the annual average maximum temperature is projected to increase by 5.1 to 10.4 °F, and the annual average minimum temperature is project to increase by 5.9 to 10.3 °F (CEC 2018). A summary of the historical average and 2050 and 2099 minimum and maximum temperature projections is shown in Table 1.1-1.

Table 1.1-1 Maximum and Minimum Temperatures for the City of Murrieta

	Historical Average (Max/Min)	2050 Projected (Max/Min)	2099 Projected (Max/Min)
Low-Emissions Scenario	79.8°F/47.1°F	84.6°F /51.8°F	84.9°F /53.0°F
High-Emissions Scenario		84.7°F/52.2°F	90.2°F/57.4°F

°F = Degrees Fahrenheit

Source: CEC 2018 data for City of Murrieta Grid Cell (33.59375,-117.21875)

EXTREME HEAT EVENTS AND HEAT WAVES

Increased temperature is expected to lead to secondary climate change impacts, including increases in the frequency, intensity, and duration of extreme heat days and heat waves. Cal-Adapt defines the extreme heat day threshold for the City as 105.1 °F or higher, between April 1st and October 31st. The City historically has averaged five extreme heat days per year between 1950 and 2005. The City is projected to experience an average of 26 to 36 extreme heat days per year by 2050, and 27 to 62 extreme heat days per year by 2099, depending upon the emissions scenario used for projections (CEC 2018).

Heat waves, which can be defined as five or more consecutive extreme heat days, have been historically infrequent in the City, with no more than one heat wave occurring in a year. However, a rise in the frequency of heat waves from two to five heat waves per year by 2050 and two to 11 heat waves per year by 2099 is projected, depending upon the emissions scenario used for projections (CEC 2018).

URBAN HEAT ISLAND EFFECT

Urbanized areas can experience higher temperatures, greater pollution, and more negative health impacts during hot summer months when compared to more rural communities. This phenomenon is known as an urban heat island. Heat islands are created by a combination of heat-absorptive surfaces (such as dark pavement and roofing), heat-generating activities (such as engines and generators), and the absence of vegetation (which provides evaporative cooling). According to the U.S. Environmental Protection Agency (EPA), daytime temperatures in urban areas are on average 1 to 6 °F higher than in rural areas, while nighttime temperatures can be as much as 22 °F higher as the heat is gradually released from buildings and pavement (California Environmental Protection Agency [CalEPA] 2018a).

The CalEPA's Urban Heat Island Index shows urban heat islands in California. The Urban Heat Island Index is calculated as a temperature differential over time between an urban census tract and nearby upwind rural reference points. Local wind patterns dissipate the adverse impacts of urban heat island effects. The index is reported in degree-hours per day on a Celsius scale, as a measure of heat intensity over time. An increase of one degree over an eight-hour period would equal eight degree-hours, as would an increase of two degrees over a four-hour period (CalEPA 2018b). The City generally experiences mild winds from the southwest which provide little relief from the urban heat island effect (National Oceanic and Atmospheric Administration [NOAA] 2018). The heat index for the City is 131.6 degree-hours per day, which is

approximately equal to a 9.9 °F average temperature difference between the City and nearby rural areas (CalEPA 2018b).

1.1.2 Changes in Precipitation Patterns

The City's water supply comes from local sources of groundwater and surface water, imported water from the Metropolitan Water District's Colorado River Aqueduct and the State Water Project, recycled water reclamation facilities, and water transfers and exchanges (City 2011). Increased temperatures, particularly in the Sierra Nevada region, which supports the State Water Project, as well as the Rocky Mountains, which heads the Colorado River, will lead to earlier and faster snowmelt and could leave the City vulnerable to water resource fluctuation during historically dry months (July-September). Additionally, as temperatures rise and snowpack decreases, the dry season may manifest earlier in the year and extend later, leading to a longer season of water insecurity.

While projections generally show little change in total annual precipitation in California, even modest changes could have a significant effect on California ecosystems that are conditioned to historical precipitation levels. Reduced precipitation could lead to higher risks of drought, while increased precipitation could cause flooding and soil erosion (CNRA 2014). The City has an historical annual average (1950 to 2005) precipitation of 15.0 inches. The annual precipitation in the City is projected to be 15.7 to 17.8 inches by 2050, and 15.0 to 21.4 inches by 2099, depending upon the emissions scenario used for projections (CEC 2018).

DROUGHT AND GROUNDWATER

As of early 2018, the National Drought Mitigation Center classified a majority of Riverside County as being in a "severe drought," the third-most intense drought condition classification (National Integrated Drought Information System [NIDIS] 2018). Although precipitation projections tend to be less certain than other types of climate change projections, a slight decrease in average precipitation is expected in the region through midcentury (CEC 2013).

The City relies on numerous wells within the local groundwater basin as an important source of water supply to each of the retail water purveyors that serve the City and its sphere of influence. Major groundwater basins underlying the City include the Murrieta-Temecula Basin and the French Basin, which rely on surface streams for groundwater recharge (City 2011b). Increased average temperatures and changes in the timing, amounts, and snow/rain form of precipitation could affect local groundwater recharge. Groundwater use typically increases during droughts, which due to the uncertainty in the amount and timing of water availability could result in challenges in providing adequate groundwater supply to meet future demand (Western Riverside Council of Governments [WRCOG] 2014).

EXTREME STORMS

Changes in precipitation patterns may result in less frequent, but more extreme storm events (EPA 2017). The City is projected to experience a slight increase in overall precipitation which may fall with more intense characteristics (i.e., high volume over a short period of time with stronger wind patterns). These storms may produce higher volumes of runoff and contribute to increased flood risks and associated impacts.

1.1.3 Increased Wildfire Risk

Increased temperatures and frequency of extreme heat events, along with changes in precipitation patterns, can lead an increase in the frequency and intensity of wildfires (Governor's Office of Planning and Research

[OPR] 2018). The City is surrounded by relatively rural and undeveloped hillsides and ranches with a high potential for wildfires which can exacerbated by occasional Santa Ana winds and high temperatures (City 2011). Additionally, extreme weather conditions, such as high temperature, low humidity, and/or winds of extraordinary force, may cause an ordinary, localized fire to expand into a more intense and difficult to control wildfire.

The California Department of Forestry and Fire Protection (CAL FIRE) has developed the City's Fire Hazard Severity Zone Map, identifying Very High Fire Hazard Severity Zones in the City that are included in the Local Responsibility Area. The map shows that a substantial portion of the City, including areas along the western edge of the City at the base of the Santa Rosa Plateau and the northeastern rural City neighborhoods, are identified as Very High Fire Hazard Severity Zones (CAL FIRE 2009). The historic annual (1950 to 2005) mean hectares burned in Riverside County is 4,861.1 hectares or approximately 12,012 acres. The annual mean area burned is projected to increase by 15 percent by 2050 and by 11 percent by 2099 under the high-emissions scenario (CEC 2018).

In addition to increased threats to human safety, the increased threats to human safety, the increased frequency of wildfire results in the release of harmful air pollutants into the atmosphere, which dissipate and can affect the respiratory health of residents across a broad geographical scope. Particulate matter (soot and smoke), carbon monoxide, nitrogen oxides, and other pollutants are emitted during the burning of vegetation and can cause acute (short-term) and chronic (long-term) cardiovascular and respiratory illness, especially in vulnerable populations such as the elderly, children, agricultural and outdoor workers, and those suffering from pre-existing cardiovascular or respiratory conditions (OPR 2018).

1.1.4 Increased Flood Risk

Climate change is predicted to modify the frequency, intensity, and duration of extreme storm events, such as sustained periods of heavy precipitation and increased rainfall intensity during precipitation events. These projected changes could lead to increased flood magnitude and frequency. (IPCC 2014). The City lies within the inland portion of the Santa Margarita River Basin. Murrieta Creek and Temecula Creek are primary tributaries to this basin and flow through the City. Stream flows in Murrieta Creek, which flows southeasterly through the portion of the City that lies between Interstate 15 (I-15) and the base of the Santa Rosa Plateau, have been highly variable, and flooding frequently occurs in Historic Murrieta. Most areas along this creek and its associated tributaries lack formal flood control systems, as a result, drainage in some areas is dependent on natural features and can result in flooding in less developed areas, even with moderate rain (City 2011).

Increased precipitation and extreme storm events because of climate change, as described previously, would result in increased flood scenarios and major flooding events. The City's flooding potential will be exacerbated when experiencing atmospheric rivers, or narrow streams of warm, concentrated precipitation often resulting in the deposition of considerable rainfall over a short period of time. Expected increases in average temperature would increase the intensity and magnitude of atmospheric rivers, resulting in increased regional and localized flooding (Dettinger 2011).

1.2 STEPS 2 AND 3: SENSITIVITY AND POTENTIAL IMPACTS

For the purposes of this Vulnerability Assessment, Steps 2 and 3 are discussed together as they are closely related. Step 2 includes the use of systematic evaluation to identify populations, functions, and structures that may be affected by projected exposures to climate change impacts and their degree of sensitivity. These determinations are made with a simple "yes" or "no" answer. This evaluation uses the APG's recommended

sensitivity checklist, and focuses specifically on resources in the City potentially affected by climate change impacts identified in Section 1.1, "Step 1: Exposure."

APG's sensitivity checklist is organized into three main categories: Population, Functions, and Structures. These categories are described in detail below.

- **Population:** Includes both the general human population and segments of the population that are most likely to be sensitive or vulnerable to climate change impacts. This applies, particularly to non-English speaking or elderly populations who may require special response assistance or special medical care after a climate-influenced disaster, and disadvantaged communities.

- **Functions:** Includes facilities that are essential to the health and welfare of the whole population and are especially important following climate-influenced hazard events. These facilities include hospitals, medical facilities, police and fire stations, emergency operations centers, evacuation shelters, and schools. Transportation systems, such as airways (e.g., airports and highways), bridges, tunnels, roadways, railways (e.g., tracks, tunnels, bridges, and rail yards), and waterways (e.g., canals, seaports, harbors, and piers) are also important to consider. Lifeline utility systems such as potable water, wastewater, fuel, natural gas, electric power, and communications are also critical for public health and safety. Functions also include other economic systems such as agriculture, recreation, and tourism, as well as natural resources within a community, including various plant and animal species and their habitat.

- **Structures:** Includes the structures of essential facilities noted above such as residential and commercial infrastructure, institutions (i.e., schools, churches, hospitals, prisons, etc.), recreational facilities, transportation infrastructure, parks, dikes and levees, and water and wastewater treatment infrastructure. It also includes high potential loss facilities, where damage would have large environmental, economic, or public safety considerations (e.g., nuclear power plants, dams, and military installations). This category also includes hazardous material facilities that house industrial/hazardous materials.

An evaluation of the severity of climate change impacts on the sensitive populations, functions, and structures is included in Step 3. Given that climate change exposures at the local scale are inherently uncertain, the APG recommends that communities conduct a qualitative assessment that describes the potential impacts based on the exposure (CNRA 2012). This assessment is not meant to be exhaustive and prescriptive, rather, it is intended to provide a high-level view of potential impacts that occur as a result of identified climate change exposures. Further evaluation and research would be needed to more precisely identify points of sensitivity and potential impacts, including specific facilities, structures, and areas of concern.

1.2.1 Increased Temperature

The average maximum and minimum temperatures in the City are project to rise between approximately 5 to 10 °F by 2099. Increased temperatures can lead to secondary climate change impacts including increases in the frequency, intensity, and duration of extreme heat events and heat waves.

POPULATIONS

Higher frequency of extreme heat conditions can cause serious public health impacts, increasing the risk of conditions directly related to heat such as heat stroke and dehydration (OPR 2018). Exposure to excessive heat may lead to heat-related illnesses such as heat cramps, heat exhaustion, and heat stroke. The most serious reaction to extreme heat and heat stroke results in severe mental status changes, seizure, loss of consciousness, kidney failure, abnormal cardiac rhythm, and death (CalEPA 2013).

Higher temperatures also result in worsened air quality through increased air pollution. Ozone formation and particulate matter generation (e.g., from wildfire smoke), pose health hazards to vulnerable populations including children, the elderly, pregnant women, and persons with pre-existing chronic diseases. Based on the 2010 U.S. census, the City's population is 103,606 residents, approximately seven percent of which are children (under five years) and approximately 12 percent are elderly (65 years and over) (U.S. Census Bureau 2017).

Extreme heat events pose greater challenges to disadvantaged communities due to sub-standard living environments and limited access to resources. Low income populations living in aging buildings with poor insulation experience higher costs associated with air conditioning; some populations in these buildings may refrain from turning on air conditions to reduce these costs, making them more susceptible to health condition risks (Singer et al. 2016). Approximately nine percent of the City's population is currently considered to be living in poverty, and approximately 11 percent of the population under 65 years is without health insurance (U.S. Census Bureau 2017).

The climate change—related impacts to populations in the City would have the greatest impact on vulnerable populations. Approximately 20 percent of the City's population is considered vulnerable population (i.e. children and elderly), and at least 11 percent of the population is considered to live in poverty or does not have access to health insurance. Climate change will result in increased temperatures in the City, including increased heat waves and extreme heat events. Further, the City experiences large temperature increases compared to the adjacent rural areas due to the urban heat island effect. This urban heat island effect, on average, increases the temperature in the City an average of nearly 10 °F higher than the adjacent rural areas.

Severity of Impacts on Populations: ***High***

FUNCTIONS AND STRUCTURES

High temperatures decrease the efficiency of power transmission lines, while demand for electricity simultaneously goes up as operation of air conditioners and cooling equipment increases. This may result in increased risk of power outages and blackouts, affecting the operation of infrastructure. Prolonged exposure to heat can exacerbate roadway degradation, as asphalt and concrete can deform at a faster rate under high temperatures and can impact bridge expansion joints as they experience expansion and contraction as temperatures fluctuate.

Energy use in buildings increases as temperature increases as a result of increased demand for cooling systems. Temperature-related power failure can adversely affect the quality of working and living environments in residential, commercial, and industrial buildings. In periods of extreme heat, loss of electricity inhibits cooling of inside areas resulting in a lack of refuge from dangerous heat. Further, economic losses may be incurred from loss of productive work time due to downed communication systems or dangerous work conditions, or in residential buildings from an inability to properly store foods susceptible to spoiling in heat.

The production of agricultural products is a major activity in Riverside County. Agricultural activities can be highly vulnerable to the impacts of climate change, including drought conditions and extreme heat. In 2014, drought conditions cost agriculture in California approximately $2.2 billion, and costs may be substantially higher in the future if continued drought further depletes groundwater supplies (WRCOG 2014). Though agriculture represents a large portion of the regional economy, it is a relatively small sector of employment for individuals working or living in the City (U.S. Census Bureau 2015).

Severity of Impacts on Structures and Functions: ***Medium***

1.2.2 Changes in Precipitation Patterns

Increased average temperatures and a hastening of snowmelt in the Sierra Nevada, Rocky Mountains, and distant portions of watersheds could affect the flows of the State Water Project and the Colorado River upon which the City relies. Reduce flow of fresh water, more persistent drought conditions, and increased water demands due to population growth will likely affect the quality and quantity of water supplies.

POPULATIONS

Increasing temperatures and changes in precipitation may lead to intensified drought conditions, which decreases the availability and quality of water for human use. This includes increased exposure to health hazards including wildfires, dust storms, extreme heat events, flash flooding, and degraded water quality (CDPH 2017). Most of the imported water used in the region comes from the Sierra Nevada range. Reduced winter precipitation levels and snowpack reduction have resulted in less fresh water available for communities throughout California. Continued decline in snowpack is expected, which may lead to lower volumes of water available for City residents (WRCOG 2014).

Severity of Impacts on Populations: ***High***

STRUCTURES AND FUNCTIONS

Extreme weather events (e.g., storms, flooding) cause fatal and nonfatal injuries from drowning, being struck by objects, fire, explosions, electrocution, or exposure to toxic materials. A widespread weather-related natural disaster may destroy or ruin housing, schools, and businesses and cause temporary or permanent displacement (CDPH 2017). Changes in precipitation patterns may increase the presence of weeds, pest insects, and other organisms that damage agricultural products as well as affect agricultural yields and increase stress on crops and animals (WRCOG 2014)

Severity of Impacts on Structures and Functions: ***Medium***

1.2.3 Increased Wildfire Risk

Increased temperatures and changes in precipitation associated with climate change are expected to increase the potential severity of wildland fires both within and beyond the boundaries of the City. As previously described, the annual mean hectares burned is projected to increase by 15 percent by 2050 and by 11 percent by 2099 under the high-emissions scenario. As higher temperatures last for longer periods of time, dead fuels of wider diameter will also become drier and contribute to increased wildfire intensity (CAL FIRE 2009).

As the climate changes, the amount of area at elevated risk for such spatially limited hazards such as wildfires increases (CEC 2012). Areas that are currently vulnerable to wildfires may face more frequent hazards, and the wildfires themselves may be more severe. Wildfires may also begin to affect areas that are not currently vulnerable, and these risks may be exacerbated by high development pressure, resulting in more buildings and infrastructure built in high-risk areas (WRCOG 2014).

POPULATIONS

Different areas of the community and populations are especially vulnerable or resilient to wildfires in the City, particularly for hazards where rapid evacuation may be necessary. Factors that make residents or

employees more vulnerable to wildfire include individuals with disabilities, access to vehicles, income levels, buildings located in high-risk areas, and working conditions (WRCOG 2014).

Six percent of the City's population under 65 lives with a disability, and approximately nine percent of the City's population lives below the poverty level (U.S. Census Bureau 2017). Individuals with disabilities could have limited mobility and could be medically dependent on electronic devices. Physically disabled individuals may have limited mobility in case of evacuation, and respiratory problems could be aggravated by smoke. Low income individuals are less likely to have access to high quality housing units, support networks, or other resources that limit exposure to poor air quality or protect against fire. They are also less able to recover and rebuild their quality of life if fire results in the destruction of their property or affects their health.

In addition to increased threats to human safety, the increased risk of catastrophic wildfire results in the release of harmful air pollutants into the atmosphere, which dissipate and can affect the respiratory health of residents across a broad geographical scope. Particulate matter (soot and smoke), carbon monoxide, nitrogen oxides, and other pollutants are emitted during the burning of vegetation and can cause acute (short-term) and chronic (long-term) cardiovascular and respiratory illness, especially invulnerable populations such as the elderly, children, agricultural and outdoor workers, and those suffering from preexisting cardiovascular or respiratory conditions (CDPH 2017).

*Severity of Impacts on Populations: **High***

STRUCTURES AND FUNCTIONS

While periodic fires originate from natural processes and provide important ecological functions, catastrophic fire events that cannot be contained or managed can cause serious threats to homes and infrastructure, especially for properties located at the wildland-urban interface. Damage to ecological functions may result as the risk of fire increases. When rain falls in burn scarred areas, there is a higher potential for soil erosion and mudflows into roads, ditches, and streams, and potentially resulting in property damage or loss.

Increased industrial complexes, transportation networks, utility networks, and general development along the wildland-urban interface increases the risk for wildfires to affect structures. Hazardous materials, associated with the development of industrial buildings and potentially present along transportation networks could increase the risk associated with wildfires (County of Riverside [County] 2012). The undeveloped hillside areas in and adjacent to the City present a potentially serious hazard due to the high potential for large scale wildland fires. The western boundary of the City has high wildland fire threats and is currently developed with various low-density residential neighborhoods.

Wildfires often result in the closure of roadways and/or damage to transportation infrastructure which may cause increased congestion or delay during and for months after a wildfire event. Road closures could create additional issues related to evacuating affected areas, and providing emergency vehicle access to affected buildings and populations.

*Severity of Impacts on Structures and Functions: **High***

1.2.4 Increased Flood Risk

The City is located within the inland portion of the Santa Margarita River Basin. Murrieta Creek and Temecula Creek are the main tributaries of the Santa Margarita River. Stream flows for Murrieta Creek have been highly variable and flooding frequently occurs along sections that lack formal flood control, even in moderate rain. A total of 1,021.2 acres in the City are within the 100-year flood zone. Portions of the City are

also subject to potential flooding in the event of dam failure at Lake Skinner or Diamond Valley Lake (City 2012). While it is uncertain exactly how climate change will affect flooding events in the City and to what extent, any increase in flooding is likely to have serious ramifications as the area is already vulnerable.

The rivers in western Riverside County are typically dry or nearly dry for most of the year and generally only pose flood threats to developments within the floodplain during general storms of long duration. Increased urbanization and the resulting increase in impervious surfaces has increased flood potential (County 2014).

POPULATIONS

Flooding will most adversely affect populations living in 100-, 200-, and 500-year floodplains. Flood events can result in population displacement, death from drowning, injuries, and water- and food-borne diseases from sewage overflow (CDPH 2017). Populations with limited mobility (e.g., dependent on public transportation, without a vehicle) are considered more vulnerable to flood events because the ability to use sandbags or evacuate is reduced. Flooding could result in the release of sewage and hazardous and/or toxic materials if wastewater treatment plants are inundated, storage tanks are damaged, or pipelines are severed (WRCOG 2014). Flash flooding could occur as a result of heavy rain on burn scarred areas, and regular flooding already occurs in certain areas of the City. In the event of a normal flood condition, residents would have advanced notice to the threat of rising flood waters, providing adequate time to prepare and/or evacuate. While areas of the City are threatened by increased flooding, the population would generally have adequate time to identify and react to direct threats to their health and safety.

Severity of Impacts on Populations: ***Medium***

STRUCTURES AND FUNCTIONS

Increased flooding associated with climate change will stress communities and infrastructure, and may also threaten the biodiversity that occurs along the streams and creeks within the City. Unlike natural flooding regimes, wherein seasonal flooding results in the deposition of useful sediment (resulting in increased soil fertility as well as groundwater recharge), flash flooding and increased flood events could lead to the destruction of crops along streams, erosion of topsoil, and excessive soil saturation.

Flooding may also result in economic losses through closure of businesses and government facilities, disrupt communications and the provision of utilities, and result in increased expenditures for emergency services. Roadways exposed to high volumes of water become more susceptible to damage from excess moisture (California Department of Transportation [Caltrans] 2013).

Severity of Impacts on Structures and Functions: ***Medium***

1.3 STEP 4: ADAPTIVE CAPACITY

The evaluation of the adaptive capacity of populations, functions, and structures identified in Steps 2 and 3 involves determining a community's current ability to address the points of sensitivity and impacts associated with climate change. This step includes a review of the City's existing policies, plans, programs, resources, and institutions to reflect its current ability to adapt to climate change and reduce vulnerability. Adaptive capacity to each of the climate change impacts is rated low, medium, or high. A low adaptive capacity indicates that a community is unprepared, while a high adaptive capacity indicates that sufficient measures are already in place to address the points of sensitivity and impacts associated with climate change.

The City, County, and WRCOG address current and future impacts related to existing natural hazards through their planning processes. The following plans, produced by these agencies, address various hazards and climate change impacts at local and regional levels.

- The City Safety Element (Chapter 14 of the City's General Plan Update) describes hazards that exist in the City and the measures being taken to address them.
- The City Emergency Operations Plan (EOP) addresses the planned response to extraordinary emergency situations associated with natural disasters, technological incidents, and national security emergencies in or affecting the City. The EOP establishes the framework for implementation of State emergency management systems.
- The City of Murrieta Local Hazard Mitigation Plan (LHMP), produced by the County, identifies vulnerabilities, provides recommendations for prioritized mitigation actions, evaluates resources and identifies shortcomings, and provides future mitigation planning for the City.
- The WRCOG has created the Subregional Climate Action Plan (Subregional CAP) Adaption and Resiliency Strategy, providing an overview of expected climate change effects, assets in the subregion that are vulnerable to climate change effects, and adaptation strategies intended to reduce vulnerability and increase resilience. The strategies provided represent actions that increase resilience to natural hazards regardless of the rate and severity of climate change.

1.3.1 Adaptive Efforts Related to Increased Temperature

Efforts occurring in the City to adapt to or reduce the impacts of extreme heat days, heat waves, and urban heat islands are summarized below:

- The U.S. Department of Energy (DOE) Weatherization Assistance Program (WAP) provides grants to states, territories, and Native American tribes to improve the energy efficiency of low-income homes. Recipients then contract with local governments and nonprofit agencies to provide weatherization services to low-income homes in need of energy upgrades (DOE n.d.). The California WAP program allocates funds to various local governments, which provide grants to the entities that apply for them. WAP-related upgrades (e.g., replacing windows, weather-stripping, insulating attics and water heaters) in Sacramento County are provided by various organizations such as the Community Resource Project, Inc. and GRID Alternatives. Increasing the affordability of energy appliances provides low-income residents the financial capacity to air condition their homes during times of high heat. The State Greenhouse Gas Reduction Fund (GGRF) also provides funding for weatherization, residential rooftop solar and tree planting in disadvantaged communities.
- The County and City participate in the Home Energy Opportunity (HERO) Program, which is a part of the Property Assessed Clean Energy Program. HERO helps homeowners reduce energy bills and decrease water consumption through special financing options.
- WRCOG, in collaboration with Riverside Public Utilities, offers incentives for residential customers to upgrade the efficiency of a variety of equipment within eligible homes. The program encourages residents to upgrade appliances, building materials, and home furnishings with high-efficiency products to reduce water and energy use.
- The Subregional CAP includes the following recommended adaption strategies related to increased temperatures, extreme heat days, heat waves, and urban heat islands:
    - Strategy 1.3: Incorporate extreme heat and air quality annexes into emergency management plans.

- Strategy 2.4: Identify and map cooling centers in locations accessible to vulnerable populations and establish standardized temperature triggers for when they will be opened.
- Strategy 2.5: Identify ways for individuals with restricted mobility to reach cooling centers.
- Strategy 3.4: Work with local volunteer emergency response teams to include extreme heat as a hazard of concern and update core competencies to address the health-related risks of extreme heat events.
- Strategy 4.1: Use materials and features in transportation infrastructure that can improve resiliency to extreme heats.
- Strategy 6.1: Promote and expand the use of drought-tolerant green infrastructure, including street trees, and landscaped areas as part of cooling strategies in public and private spaces.
- Strategy 6.2: Amend the local development code to require high-reflectivity pavement or increased tree cover in large commercial parking lots.

The City and region have numerous adaptation plans and services available for extreme heat events and heat waves (i.e., cooling centers, heat wave advisories), and the City is improving the means by which residents are educated about existing plans (i.e. improved alert systems to notify residents of cooling center locations and extreme temperature events). In general, many of the policies and plans provide only recommendations to improve energy efficiency and reduce the impacts of temperature increases.

Adaptive Capacity for Increases in Temperature: ***Medium***

1.3.2 Adaptive Efforts Related to Changes in Precipitation

Efforts occurring in the City to adapt to or reduce the impacts of precipitation changes, extreme storms, and droughts are summarized below:

- The City has one designated severe weather center which is open and accessible when a Public Health "Heat/Cold Warning" is issued. The City utilizes the County Public Health Department heat and cold advisories to activate the center. The City also utilizes protocols to ensure the safety of residents during extreme residents such as "spray downs" during extreme heat events at large gatherings.
- The County and City participate in the HERO Program, which is a part of the Property Assessed Clean Energy Program. HERO helps homeowners reduce energy bills and decrease water consumption through special financing options.
- The City and its Community Services District have taken proactive measures to reduce water costs and use by replacing old technology for irrigation, exchanging overhead spray systems with drip (point-to-point) irrigation, and by replacing outdated landscaping with water-wise material. The City also provides information to residents on water consumption rebates provided by the various water districts serving the community.
- WRCOG, in collaboration with Riverside Public Utilities, offers incentives for residential customers to upgrade the efficiency of a variety of equipment within eligible homes. The program encourages residents to upgrade appliances, building materials, and home furnishings with high-efficiency products to reduce water and energy use.

- The Subregional CAP includes the following recommended adaption strategies related to changes in precipitation, extreme storms, and droughts:
  - Strategy 4.1: Use materials and features in transportation infrastructure that can improve resiliency to extreme events.
  - Strategy 5.5: Encourage the use of low-impact development practices in new development.
  - Strategy 6.1: Promote and expand the use of drought-tolerant green infrastructure, including street trees, and landscaped areas as part of cooling strategies in public and private spaces.
  - Strategy 6.3: Identify and implement municipal renewable energy projects for daily and emergency operations.
  - Strategy 7.2: Encourage efficient irrigation techniques and identify financial resources to support installation.
- Beginning in 2016, all retail water suppliers were required to comply with the water conservation requirements in Senate Bill X7-7 to be eligible for state water grants or loans. Each district is required to set targets and track progress toward decreasing daily per capita urban water use in an effort to meet the State's 20 percent water reduction goal. The City receives its water supply from four water districts: Rancho California Water District, El Sinore Valley Municipal Water District, Western Municipal Water District, and Eastern Municipal Water District. Each district has prepared and updated an urban water management plan for their respective service areas.

The City and region provide opportunities to reduce water usage in the community. The City is served by multiple retail water provides which reduces the City's ability to control the adaptability of its water supply to meet future demands or respond to threats. The City participates in various programs that assist with the reduction in residential energy and water usage. The City's municipal code has also incorporated adaptation measures into building and infrastructure design to improve water and landscaping efficiency (City municipal code 16.28 "Landscaping Standards and Water Efficient Landscaping")

Adaptive Capacity for Changes in Precipitation: ***Medium***

1.3.3 Adaptive Efforts Related to Increased Wildfire Risk

Efforts occurring in the City to adapt or reduce the impacts of wildfires are summarized below:

- The Murrieta Fire Department (Murrieta Fire and Rescue, MFR) engages in activities that are aimed at preventing fires and compliance with California Building Standards Code, Chapters 7 and 7A, and the California Fire Code. The MFR provides fire protection engineering, building inspections for code compliance, and hazardous materials inspections. The MFR also provides education and training in public safety and emergency preparedness.
- The MFR implements a Weed Abatement Program to reduce weed and brush fire hazards. This program provides for property inspections and enforcement on properties that pose a potential fire hazard due to weeds and brush.
- Conditions of development are currently required in the City under Title 15.24, "California Fire Code and California Fire Code Standards", of the City municipal code, such as Class A roofing (defined as the highest level of fire resistant roofing material, rated by ASTM E108) noncombustible siding, and 100-foot fuel buffer zones.

- The Subregional CAP includes the following recommended adaption strategies related to wildfire risk:
  - Strategy 5.1: Continue to provide information to homeowners about statutory vegetation management requirements.
  - Strategy 5.3: Establish neighborhood and building design standards that minimize fire hazards in high wildfire risk areas
- The City's LHMP includes the following objectives related to wildfire risk:
  - Objective 5.1: Continue efforts to reduce fire hazards associated with older buildings, multifamily housing, and fire-prone industrial facilities throughout the City.
  - Objective 5.2: Provide public safety education programs through the MFR to reduce accidents, injuries and fires, as well as train members of the public to respond to emergencies.
  - Objective 5.3: Continue to coordinate fire protection services with Riverside County, CAL FIRE, and all other agencies and districts with fire protection powers.
  - Objective 5.4: Ensure that outlying areas in the City can be served by fire communication systems as new development occurs.

A majority of the City's efforts to adapt to wildfire impacts of climate change correspond with general best practices for wildfire management and prevention. The City's adaptation strategies provide measures that reduce wildfire risk to people and property within the City. Climate change is projected to exacerbate the risk due to increased temperatures and changes in precipitation patterns. The City, with the assistance of the County, will need to continue to adapt to reduce these effects. The City currently has no defined emergency routes which reduces the capacity of the City to react during wildfire events.

Adaptive Capacity for Wildfire Risk: ***Medium***

1.3.4 Adaptive Efforts Related to Increased Flood Risk

Efforts occurring in the City to adapt or reduce the impacts of flooding are summarized below:

- The City's regulations with respect to flood damage prevention are included in the Murrieta Municipal Code Chapter 15.56, "Flood Damage Prevention Regulations." The purpose of this chapter is to promote the public health, safety, and general welfare, and to minimize the public and private losses due to flood conditions in specific areas.
- The City is located within Flood Control District Zone 7 of the Riverside County Flood Control and Water Conservation District. A Master Drainage Plan prepared for Murrieta Creek by the District evaluates drainage needs and proposes an economical drainage plan to provide flood protection for both existing and future development in the City. Improvements proposed for Murrieta Creek consist of the channelization of the creek and its major tributaries and include several concrete- lined open channels and a small network of underground storm drains.
- The City participates in the National Flood Insurance Program's (NFIP) Community Rating System (CRS) which provides a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed minimum NFIP requirements. Participation in this program provides discounted flood insurance premium rates to reflect the reduce flood risk resulting from the community actions.

- In 1997, the U.S. Army Corps of Engineers initiated studies on Murrieta Creek resulting in the Murrieta Creek Flood Control, Environmental Restoration and Recreate Project. Limited funding has been appropriated for the construction of this project.
- The Subregional CAP includes the following recommended adaption strategies related to flood risk:
  - Strategy 5.2: Encourage retrofits of hardscaped areas to use permeable paving.
  - Strategy 5.4: Restore riparian corridors, soft-bottomed streambeds, and seasonal flood basins that reduce flood hazards.
  - Strategy 5.5: Encourage the use of low-impact development practices in new development.
  - Strategy 5.6: Avoid siting important infrastructure in or near flood areas.
- The City's LHMP includes the following objectives related to flood risk:
  - Objective 3.1: Cooperate with the Riverside County Flood Control and Water Conservation District to evaluate the effectiveness of existing flood control systems and improve these systems as necessary to meet capacity demands.
  - Objective 3.2: Actively participate in and strongly promote timely completion of regional drainage plans and improvement project which affect the City.
  - Objective 3.3: Identify natural drainage courses and designate drainage easements to allow for their preservation, or for the construction of drainage facilities if needed to protect the health, safety, and welfare of the community.
  - Objective 3.4: Require new construction within the 100-year floodplain to meet National Flood Insurance Program standards.
  - Objective 3.5: Develop and maintain floodplain inundation evacuation plans in cooperation with the Riverside County Flood Control and Water Conservation District and the Murrieta Fire Department.
  - Objective 3.6: Maintain an active swift water rescue response in the Murrieta Fire Department.

City residents living in areas at high-risk for flooding or dam inundation have limited adaptive capacity to deal with flooding. Structural improvements to modify or elevate homes and other structures as well as the purchase of flood insurance can reduce the financial burden of recovering from flooding, however, these options are not universally acquirable. Low-income, mobility-challenged, and physically- or linguistically-isolated persons are particularly vulnerable. Ultimately, the safety of City residents will be dependent on proper execution of evacuation procedures and durability of the systems in place to prevent flooding. Localized and tributary flooding will impact those living in near proximity to creeks and streams, as well as areas with older and constrained infrastructure that could back up when capacity is reached. The City is currently in the process of upgrading drainage infrastructure.

Adaptive Capacity for Flood Risk: ***Medium***

1.4 STEP 5: RISK AND ONSET

Risk and the project timeframe for which impact would occur is ranked by the likelihood or probability that a certain magnitude/extent/scale of a potential impact would occur. Risk is determined by a combination of

the estimate certainty of the science projecting the climate change impact and the certainty of sector (i.e., population, function, structure) sensitivity. This risk is ranked low, medium, or high. Certainty ratings are based on percent probability of global models created by IPCC (CNRA 2012a:29). The timeframe in which the impact is most likely to occur (based on risk) can be categorized as:

- Current: Impacts currently or imminently occurring (2018-2020)
- Near-term: 2020-2040
- Mid-term: 2040-2070
- Long-term: 2070-2100

The risk certainty for the City and the timeframe of potential climate change exposures is summarized in Table 1.4-1

Table 1.4-1 Risk and Onset for the City of Murrieta Climate Change Impacts

Impact	Certainty Rating	Timeframe
Increased Temperatures	High	Current
Increased Frequency in Extreme Heat Events	High	Near-Term
Increased Frequency in Heat Waves	High	Near-Term
Increased Urban Heat Island Effect	High	Current
Changes to Precipitation Patterns	Medium	Current
Increased Frequency in Drought	Medium	Mid-Term
Increased Frequency of Severe Storms	Medium	Mid-Term
Increased Wildfire Risk	High	Near-Term
Increased Flood Risk	Medium	Mid-Term

The table shows that increased temperature, increased frequency of heat waves and extreme heat events, and the increased wildfire risk are of high certainty rating. Temperature- and wildfire-related impacts are the most likely near-term climate change exposures facing the City and should be addressed and prioritized first in future adaption planning efforts. With populations increasing and water supply already strained in the region, future meteorology, snowpack, streamflow, and groundwater conditions should continue to be examined more closely with actions taken to enhance the conservation and management of water supply and storage.

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Memo

455 Capitol Mall, Suite 300
Sacramento, CA 95814
916.444-7301

Date: July 12, 2019

To: Danny Serrano, RICK Engineering

From: Andrew Martin and Kai Lord-Farmer, Ascent Environmental

Subject: City of Murrieta Climate Action Plan Update
Draft Technical Memorandum: Greenhouse Gas Emissions Inventory, Forecasts, and Reduction Targets

INTRODUCTION

The City of Murrieta (City) adopted a Climate Action Plan (CAP) on July 19, 2011, as part of the City's 2011 General Plan. The City's 2011 CAP included a goal to reduce emissions to 1990 levels by 2020 to remain consistent with the statewide greenhouse gas (GHG) emission reduction goal set forth in Assembly Bill 32. The City is currently updating its Climate Action Plan concurrent with efforts to prepare a focused update of the City's General Plan (GPU). The updated CAP will be consistent with new State legislation and guidance issued since the 2011 CAP was adopted. Ascent has completed several technical analyses required for the preparation of the CAP update, including: (1) a new 2016 GHG emissions inventory to serve as the baseline year for the CAP; (2) new GHG emission forecasts for 2020, 2030, 2035 (GPU horizon year) and 2050; (3) revised GHG emission reduction targets for the forecast years. This technical memorandum summarizes the results of the analyses, including methods, assumptions, emission factors, and data sources.

ORGANIZATION OF THIS MEMORANDUM

This memorandum consists of four main sections:

- **Section 1: GHG Emissions Inventory** summarizes the 2016 GHG emissions inventory developed. The emissions inventory includes the following emissions sectors: building energy, on-road transportation, off-road transportation, solid waste, water use, and wastewater.

- **Section 2: GHG Emissions Forecasts** summarizes the forecasted GHG emissions under "business-as-usual" (BAU) and legislative-adjusted BAU scenarios. A BAU scenario is one in which no action is taken by local, State or federal agencies to reduce GHG emissions. A legislative-adjusted scenario is one in which BAU conditions are adjusted to reflect policy or regulatory actions enacted by State or federal agencies, but without considering any local actions to reduce GHG emissions.

- **Section 3: GHG Reduction Targets** identifies recommended GHG emission reduction targets for 2020, 2030, 2035, and the longer-term goal for 2050, and shows the calculated gap between estimated GHG reductions under the forecast scenarios and the recommended emission reduction targets. The recommended GHG emission reduction targets for each year are provided to demonstrate consistency between the City's GHG emissions and State GHG reduction targets established through legislation and executive order.

- **Section 4: Next Steps** briefly discusses the next steps in the climate action planning process and what is needed to achieve the GHG reduction targets discussed in Section 3.

1 EMISSION INVENTORY

1.1 2016 GREENHOUSE GAS EMISSIONS INVENTORY

The purpose of the GHG emissions inventory is to gain an understanding of the sources and levels of GHG emissions within the City's jurisdiction, as well as to establish a baseline against which future GHG emissions forecasts can be compared. The GHG emissions inventory for the City was prepared for the calendar year 2016. The 2016 GHG emissions inventory is considered the baseline year for the preparation of GHG emissions forecasts and GHG reduction targets that will be used in the City's CAP update.

The 2016 GHG emissions inventory is summarized below in Table 1. GHG emissions in this inventory include communitywide emissions resulting from activities occurring and permitted to occur within the existing city limits in 2016, which were approximately 890,520 metric tons of carbon dioxide equivalent ($MTCO_2e$). The emissions sectors included in the inventory are residential and commercial energy use, industrial energy use, on-road vehicles, off-road vehicles, solid waste, water use, and wastewater. The largest emissions sector is on-road vehicles, representing approximately 76 percent of all communitywide GHG emissions in 2016.

Table 1 2016 City of Murrieta Communitywide Greenhouse Gas Inventory

Sector	2016 ($MTCO_2e$/year)	Percent of Total
On-Road Vehicles	679,920	76%
Off-Road Vehicles	11,741	1%
Transportation Sector Total	691,661	77%
Residential Energy	104,352	12%
Commercial Energy	27,410	3%
Industrial Energy	24,784	3%
Building Sector Total	156,546	18%
Solid Waste	40,038	4%
Wastewater and Water-Related	2,275	0.3%
Total (All Sectors)	890,520	100%

Notes: Totals may not add due to rounding. $MTCO_2e$ = metric tons of carbon dioxide equivalent; GWP = Global Warming Potential

Source: Data compiled by Ascent Environmental in 2019.

2 EMISSIONS FORECASTS

2.1 GREENHOUSE GAS EMISSIONS FORECASTS TO 2020, 2030, 2035, 2050

Emission forecasts were calculated for two emissions scenarios, including (1) BAU conditions and (2) legislative-adjusted BAU conditions. The BAU forecast scenario accounts for future growth in emissions associated with future growth and activity levels in the City but assumes no future action to reduce GHG emissions by State or federal agencies. In contrast, the legislative-adjusted BAU (ABAU) forecast scenario accounts for future growth in emissions associated with future growth and activity levels in the City, along with legislative actions to reduce emissions due to State and federal regulations, programs, or other mandated actions. A summary of legislative reductions applied is provided below in Table 5. These forecast scenarios provide the City with the information needed to focus its GHG reduction efforts on the emission sectors and sources that have the most GHG reduction opportunities, considering what State and federal legislative reductions are already achieving or are expected to achieve in the future.

BAU forecasts described in this section for 2020, 2030, 2035 and 2050 are generally based on the State's GHG reduction target years established in key State legislation and policies, including Assembly Bill (AB) 32, Senate Bill (SB) 32, Executive Order (EO) B-30-15, and EO S-3-05; as well as the buildout year for the GPU (2035). The Statewide GHG reduction targets are as follows:

- 1990 levels by 2020 (AB 32);
- 40 percent below 1990 levels by 2030 (SB 32 and EO B-30-15); and,
- 80 percent below 1990 levels by 2050 (EO B-30-15 and S-3-05).

Estimated BAU emission forecasts were based on demographic forecasts, including annual population, jobs, and household growth between 2016 and 2050 for the City, as developed by Iteris and VRPA for the traffic and vehicle miles traveled (VMT) modeling of the GPU. To remain consistent with the demographic forecasts used for the GPU traffic and VMT modeling, Ascent has used forecast data provided by Iteris and VRPA regarding population, jobs, and household growth in the City through the year 2040. These forecasts are based on the land use configuration to be included in the GPU. Ascent has extrapolated a population, jobs, and household growth estimate for 2050 using the growth rates provided between 2016 and 2040. Table 2 below shows the annual growth rates for 2020, 2030, 2035 and 2050. To estimate long-term growth trends and account for variability in short-term growth trends (e.g., 2020-2030), Ascent has used the 2016-2050 annual growth rate in the forecasted BAU and ABAU scenarios.

Table 2 Annual Growth Factors (%)

Factor	2016 to 2020	2020 to 2030	2030 to 2035	2035 to 2050	2016 to 2050
Population	1.07	1.00	0.93	0.94	0.97
Jobs	7.68	5.07	3.63	4.21	4.78
Dwelling Units	1.25	1.15	1.06	1.00	1.00
Vehicle Miles Traveled	1.69	1.52	1.36	1.40	1.46

Source: Data compiled by Ascent Environmental in 2019.

Table 3 shows the population, jobs, household, and daily VMT forecast that was provided by Iteris and VRPA with 2050 projections extrapolated based on the 2016 through 2040 annual growth rate.

Table 3 Demographic and Daily Vehicle Miles Traveled Forecast (2016-2050)

Factor	2016	2020	2030	2035	2050
Population	110,897	115,718	127,772	133,798	154,003
Jobs	28,628	38,485	63,128	75,450	139,986
Dwelling Units	35,534	37,341	41,859	44,118	49,912
Daily Vehicle Miles Traveled	4,132,649	4,419,630	5,137,080	5,495,806	6,768,910

Source: Data compiled by Ascent Environmental in 2019.

Table 4 includes the BAU emissions forecast for each emissions sector from 2016 through 2050. Table 4 also includes the growth factor which was applied to each emissions sector and the annual activity data which was used to estimate emissions in each sector.

Table 4 Business-As-Usual Forecasts ($MTCO_2e$/year)

Sector	Activity Data	Growth Factor	2016	2020	2030	2035	2050
Residential Energy	Kilowatts (kW) and Therms	Population	114,112	131,204	190,170	139,230	161,409
Commercial Energy		Jobs	27,410	31,418	45,102	54,575	99,861
Industrial Energy		Jobs	24,784	29,872	47,643	60,169	121,191
On-Road Vehicles	VMT	VMT	679,920	727,135	845,173	904,192	1,113,648
Off-Road Vehicles	Diesel Fuel Use	OFFROAD Model[1]	11,741	12,580	15,237	16,755	19,781
Solid Waste	Landfill Disposal Rate (Tons)	Population	40,038	41,778	45,834	48,102	55,601
Wastewater and Water-Related	Million Gallons (MG) wastewater processer; kW	Population	2,275	2,008	2,063	2,165	2,239
Total			**900,280**	**963,647**	**1,133,343**	**1,225,187**	**1,573,729**

Notes: $MTCO_2e$/year = metric tons of carbon dioxide equivalent per year.

1. Off-Road Vehicle emissions were estimated using the California Air Resources Board 2017 OFFROAD Model which included annual forecast of off-road vehicle use in Riverside County through 2050.

Source: Data compiled by Ascent Environmental in 2019.

By comparison with the BAU analysis, the City's GHG emissions, accounting for applicable legislative reductions, would decrease by 9 percent between 2016 and 2035 rather than increase by 36 percent without legislative reductions, as shown in Tables 3 and 4 and in Figure 1. Figure 1 also shows the emissions trend that would occur without anticipated legislative reductions and accounting for emission growth in the City without anticipated legislative reductions. Table 5 includes the ABAU emissions forecast for each emissions sector from 2016 through 2050. The legislative reductions applied to each GHG emissions sector are summarized below in Table 6.

Table 5 Legislative-Adjusted Business-As-Usual Forecasts ($MTCO_2e$/year)

Sector	2016	2020	2030	2035	2050
Residential Energy	114,112	114,180	113,865	114,775	116,927
Commercial Energy	27,410	42,071	51,518	59,829	101,023
Industrial Energy	24,784	4,274	3,389	3,004	266
On-Road Vehicles	679,920	669,154	592,254	585,860	591,645
Off-Road Vehicles	11,741	12,580	15,237	16,755	19,781
Solid Waste	40,038	34,182	37,501	39,356	45,491
Wastewater and Water-Related	2,275	1,916	1,410	1,208	456
Total	**900,280**	**878,357**	**815,174**	**820,787**	**875,589**

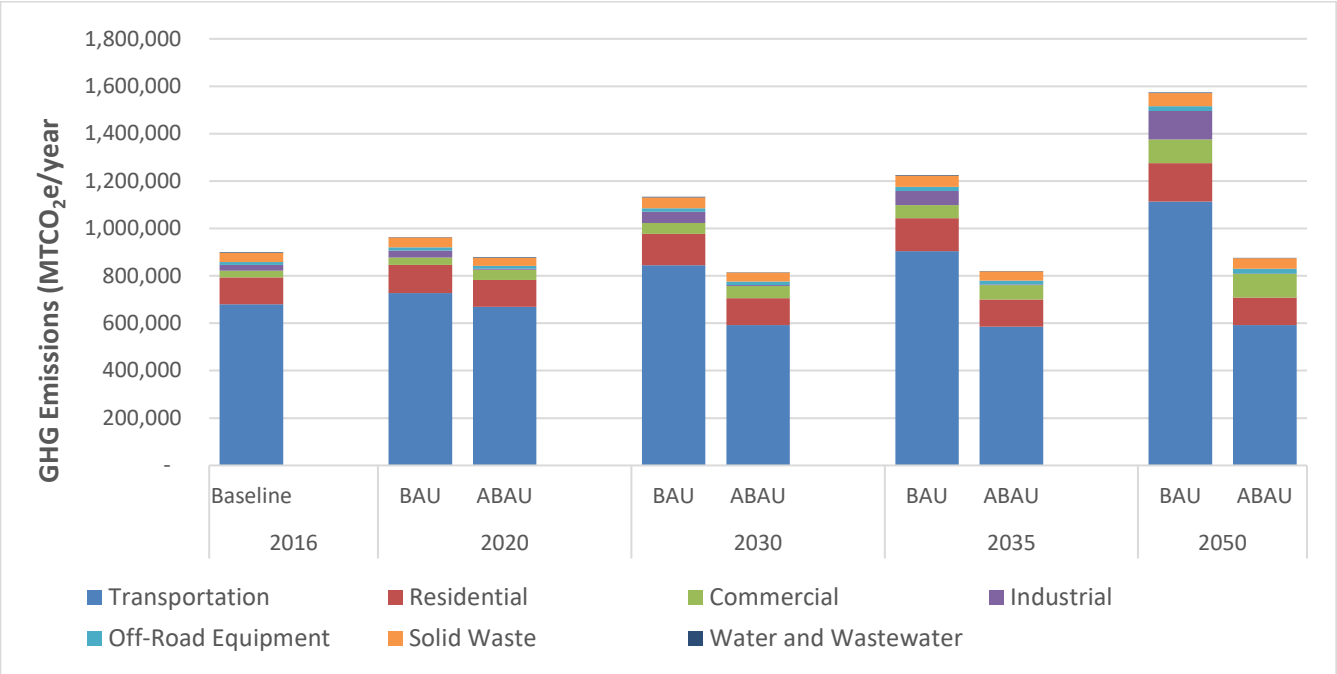
Notes: $MTCO_2e$/year = metric tons of carbon dioxide equivalent per year.

Source: Data compiled by Ascent Environmental in 2019.

Table 6 Legislative Reductions Summary

Source	Legislative Reduction	Description	Sectors Applied
State	RPS	Requires California energy utilities to procure 33 percent of electricity from renewable sources by 2020.	Building Energy, Water
State	SB 100	Requires California energy utilities to procure 60 percent of electricity from renewable sources by 2030 and 100 percent from renewable and zero-carbon sources by 2045.	Building Energy, Water
State	California Building Efficiency Standards (Title 24, Part 6)	Requires all new buildings in California to comply with energy efficiency standards established by CEC.	Building Energy
State	AB 341	California target to achieve a 75 percent solid waste diversion target by 2020.	Solid Waste
State	Pavley Clean Car Standards	Establishes GHG emission reduction standards for model years 2009 through 2016 that are more stringent than federal CAFE standards.	On-Road Vehicles
State	Advanced Clean Car Standards	Establishes GHG emission reduction standards for model years 2017 through 2025 that are more stringent than federal CAFE standards.	On-Road Vehicles
State	SBX7-7	Requires a 20 percent reduction in per capita water usage by 2020.	Water
Federal	Fuel Efficiency Standards for Medium- and Heavy-Duty Vehicles	Establishes fuel efficiency standards for medium- and heavy-duty engines and vehicles.	On-Road Vehicles

Notes: AB = Assembly Bill; CAFE = Corporate Average Fuel Economy; CEC = California Energy Commission; EPA = Environmental Protection Agency; GHG = greenhouse gas; RPS = Renewable Portfolio Standard; SB = Senate Bill; VMT = vehicle miles traveled. Source: Ascent Environmental 2019.



Notes: BAU = Business-As-Usual; ABAU = Legislative-Adujsted Business-As-Usual; GHG = greenhouse gas; $MTCO_2e$/year = metric tons of carbon dioxide equivalent per year.

Figure 1 Business-As-Usual and Legislative-Adjusted Business-As-Usual Emissions Forecasts

Emission forecasts under the legislative-adjusted BAU forecast scenario are detailed for each sector and discussed below.

2.1.2 Building Energy

Emissions from future electricity and natural gas use were estimated by multiplying anticipated energy use with forecasted emission factors. Future energy use was forecasted in three parts. First, energy use was scaled by growth factors detailed in Table 2. Second, energy emission factors were adjusted to reflect California's Renewables Portfolio Standard (RPS) targets. Electricity emission factors are anticipated to decline based on current regulations, while natural gas emission factors stay constant. Third, energy intensity factors were adjusted to reflect increased stringency expected under California's Title 24 building energy efficiency standards (i.e., 2019 standards which will go into effect on January 1, 2020) and are expected to achieve decreases in electricity and natural gas consumption in new construction. The residential building sector also accounts for emissions associated with residential electric vehicle (EV) charging which takes into account the percentage of VMT in future years based on projections in EMFAC 2017. The assumptions to energy efficiency and future electricity emission factors are described below. Table 7 summarizes the legislative factors used to scale building use by energy type.

Table 7 Building Energy Emissions Forecast Methods and Legislative Reductions by Source

Energy Type	Forecast Methods	
	Scale Factor	Applied Legislative Reductions
Electricity	Population growth for residential building energy; job growth for commercial/industrial building energy.	RPS achieved and scheduled targets (i.e., 33 percent renewable by 2020, 60 percent renewable by 2030, 100 percent renewable or zero-carbon by 2045) applied to SCE's emission factors. Accounts for 2016 to 2019 Title 24 energy efficiency gains in new construction.
Natural Gas	Population growth for residential building energy; job growth for commercial/industrial building energy.	Accounts for 2016 to 2019 Title 24 energy efficiency gains in new construction.

Notes: RPS = Renewable Portfolio Standard; SCE= Southern California Edison
Source: Ascent Environmental 2019.

RESIDENTIAL BUILDING ENERGY

Between 2016 and 2035, electricity and natural gas emissions from residential buildings would increase by 5 percent from 114,112 to 116,927 $MTCO_2e$ per year with legislative adjustments. Table 8 shows the baseline and legislative-adjusted BAU forecasted emissions from the residential building energy sector by energy type for 2016, 2020, 2030, 2035, and 2050.

Table 8 Residential Building Energy Legislative-Adjusted Business-As-Usual Emissions Forecasts (2016-2050) ($MTCO_2e$/year)

Energy Type	2016	2020	2030	2035	2050
Electricity (Associated with Residential EV Charging)	64	293	962	1,228	0
Electricity	29,849	26,372	16,514	16,928	0
Natural Gas	84,199	87,515	96,389	101,158	116,927
Total Residential Building Energy Emissions	**114,112**	**114,180**	**113,865**	**119,314**	**116,927**

Notes: Totals may not add due to rounding. $MTCO_2e$ = metric tons of carbon dioxide equivalent.
Source: Data compiled by Ascent Environmental in 2019.

COMMERCIAL AND INDUSTRIAL BUILDING ENERGY

Between 2016 and 2035, electricity and natural gas emissions from commercial and industrial buildings would increase by 58 percent from 42,489 to 65,391 $MTCO_2e$ per year with legislative adjustments. Table 9 shows the baseline and legislative-adjusted BAU forecasted emissions for the commercial and industrial building energy sector by energy type for 2016, 2020, 2030, 2035, and 2050.

Table 9 Commercial and Industrial Building Energy Legislative-Adjusted Business-As-Usual Emissions Forecasts (2016-2050) ($MTCO_2e$/year)

Energy Type		2016	2020	2030	2035	2050
Commercial Energy	Electricity	17,651	17,170	11,804	12,898	0
	Natural Gas	20,660	24,901	39,715	50,156	101,023
Industrial Energy	Electricity	4,124	4,208	3,285	3,829	0
	Natural Gas	54	66	105	132	266
Total Commercial and Industrial Building Energy Emissions		**42,489**	**46,345**	**54,908**	**67,015**	**101,289**

Notes: Totals may not add due to rounding.
$MTCO_2e$ = metric tons of carbon dioxide equivalent.
Source: Data compiled by Ascent Environmental in 2019.

ELECTRICITY EMISSION FACTORS

Electricity emissions from the building energy sector would see declines through 2045 without additional City action, despite growth, due to State measures already in place. Electricity emission factors for carbon dioxide equivalent (CO_2e) are based on Southern California Edison's (SCE) emission factor reported for 2016 (SCE 2016). California utility providers, including SCE, are scheduled to reach a 33 percent renewable electricity generation mix by 2020 and 60 percent by 2030, and 100 percent by 2045 pursuant to statewide implementation of the RPS and 100 percent electricity from renewable or zero-carbon sources pursuant to SB 100. SCE's 2016 emission factor was 0.24 metric tons of CO_2 per megawatt hour of electricity generated ($MTCO_2e$/MWh). By 2030, the emission factor will be 0.060 $MTCO_2e$/MWh. Consistent with SB 100, it was assumed that SCE would generate 100 percent of its electricity from renewable sources by 2045. For the purposes of this forecast, it is assumed that SCE would continue to make progress towards achieving the 2045 zero-carbon goal after 2030 so their 2035 emissions factor would decrease to 0.045 $MTCO_2e$/MWh.

ENERGY EFFICIENCY

The State's Title 24 Building Energy Efficiency Standards apply to both new construction and existing buildings. The 2019 Title 24 standards will go into effect in January 2020. The California Energy Commission (CEC) estimates that new residential buildings built to the 2019 standards would be 53 percent more efficient than residential buildings built to the previous standards (CEC 2015). CEC estimates that new non-residential built to the 2019 standards would be 30 percent more efficient than non-residential buildings built to the previous standards (CEC 2018).

2.1.3 Water and Wastewater

Between 2016 and 2035, water- and wastewater-related emissions from the City would decrease by 34 percent from 2,275 to 1,479 $MTCO_2e$ per year. This change reflects an increase in water consumption and wastewater generation with lower electricity factors related to the 2020, 2030, and 2045 RPS targets, consistent with SB 100 legislative actions described above, as well as a 20 percent water efficiency reduction, consistent with SBX7-7. Table 10 summarizes the legislative reductions used to forecast water and wastewater emissions.

Table 10 Water and Wastewater Forecast Methods and Legislative Reductions by Source

Source	Forecast Methods	
	Scale Factor	Applied Legislative Reductions
Water Consumption	Population growth.	Assumes electricity use for pumping, conveyance, and treatment follow the 2020, 2030, and 2045 RPS and zero-carbon schedule. Assumes a 20 percent reduction in water-related energy due to 20 percent reduction in water usage per requirements of SBX7-7.
Wastewater Treatment	Population growth.	Assumes electricity use for pumping, conveyance, and treatment follow the 2020, 2030, and 2045 RPS and zero-carbon schedule. Assumes a 20 percent reduction in wastewater-related energy due to 20 percent reduction in water usage per requirements of SBX7-7.

Notes: RPS = Renewable Portfolio Standard.
Source: Ascent Environmental 2019.

Table 11 shows the baseline and legislative-adjusted BAU forecasted emissions from water- and wastewater-related sources for 2016, 2020, 2030, 2035, and 2050. Population growth rates and electricity emission factors are detailed in Table 3 and Section 1.2.1.

Table 11 Water and Wastewater Legislative-Adjusted Business-As-Usual Emissions Forecasts (2016-2050) ($MTCO_2e$/year)

Activity	2016	2020	2030	2035	2050
Water-Related	1,605	1,242	817	643	0
Wastewater Treatment	670	674	593	565	456
Total Water and Wastewater Emissions	**2,275**	**1,916**	**1,410**	**1,208**	**456**

Notes: Totals may not add due to rounding.
$MTCO_2e$ = metric tons of carbon dioxide equivalent.
Source: Data compiled by Ascent Environmental in 2019.

2.1.4 Solid Waste

Between 2016 and 2030, solid waste emissions generated from the City would increase by two percent from 40,038 to 39,356 $MTCO_2e$ per year with legislative adjustments applied. Table 12 summarizes the legislative reductions used to forecast emissions from the solid waste sector.

Table 12 Solid Waste Forecast Methods and Legislative Reductions by Source

Source	Forecast Methods	
	Scale Factor	Applied Legislative Reductions
Landfill Disposal	Population growth.	Assumes California's 75 percent waste diversion goal would be achieved by 2020.

Source: Ascent Environmental 2019.

The forecasts shown in Table 13 below account for the CH_4 and CO_2 emissions from waste decay generated annually. With respect to solid waste generation, the California Department of Resources Recycling and Recovery (CalRecycle) established a target pursuant to AB 341 (Chapter 476, Statutes of 2011) to achieve a statewide waste diversion of 75 percent by 2020, which is equivalent to a disposal rate of 2.7 pounds of waste per resident per day. The City's waste disposal tonnage, disposal rates, and disposal targets are reported to CalRecycle by year. Emission forecasts for this sector assume the City will achieve a disposal rate of 2.7 pounds of waste per resident per day and would remain constant after 2020 through 2050.

Table 13 shows the baseline and legislative-adjusted BAU forecasted emissions from the solid waste sector for 2016, 2020, 2030, 2035, and 2050.

Table 13 Solid Waste Legislative-Adjusted Business-As-Usual Emissions Forecasts (2016-2050) ($MTCO_2e$/year)

Activity	2016	2020	2030	2035	2050
Total Solid Waste Emissions	40,038	34,182	37,501	39,356	45,491

Notes: Totals may not add due to rounding.
$MTCO_2e$ = metric tons of carbon dioxide equivalent.
Source: Data compiled by Ascent Environmental in 2019.

2.1.5 Transportation

ON-ROAD VEHICLES

Between 2016 and 2035, GHG emissions from on-road vehicles would increase by approximately 14 percent from 679,920 to 585,860 $MTCO_2e$ per year, accounting for an increase in total VMT of 33 percent, and future vehicle emission factors modeled in the California Air Resources Board's (CARB's) Emission Factor (EMFAC) 2017 model. With respect to the legislative adjustments included in this forecast, State and federal policies and associated regulations incorporated in the on-road vehicle sector include the Pavley Clean Car Standards, Advanced Clean Car Standards, and fuel efficiency standards for medium- and heavy-duty vehicles. These standards are included in EMFAC's emission factor estimates and forecasts. The Low Carbon Fuel Standard was excluded in EMFAC 2017 forecasts because most of the emission benefits originate from upstream fuel production and do not directly reduce emissions in the City's GHG inventory or forecasts. Table 14 summarizes the legislative reductions used to forecast on-road vehicle emissions.

Table 14 On-Road Vehicles Forecast Methods and Legislative Reductions by Source

Source	Forecast Methods	
	Scale Factor	Applied Legislative Reductions
On-Road Vehicles	VMT estimates provided by VRPA.	EMFAC emission factor considerations include ACC, Pavley, and fuel efficiency standards for medium- and heavy-duty vehicles.

Notes: VMT = vehicle miles traveled; EMFAC = California Air Resources Board's EMisson FACtor model; ACC = Advanced Clean Cars; Pavley = Pavley Clean Car Standards.

Source: Ascent Environmental 2019.

Table 15 shows the baseline and legislative-adjusted BAU forecasted emissions from on-road vehicles for 2016, 2020, 2030, 2035, and 2050.

Table 15 On-Road Vehicles Legislative-Adjusted Business-As-Usual Emissions Forecasts (2016-2050) ($MTCO_2e$/year)

Source	2016	2020	2030	2035	2050
On-Road Vehicles	679,920	669,154	592,254	585,860	591,645

Notes: $MTCO_2e$ = metric tons of carbon dioxide equivalent.
Source: Data compiled by Ascent Environmental in 2019.

OFF-ROAD VEHICLES

Between 2016 and 2035, emissions associated with off-road vehicles used in the city would increase by 43 percent from 11,741 to 16,755 $MTCO_2e$ per year. Table 16 shows the baseline and legislative-adjusted BAU forecasted emissions from the off-road vehicle sector for 2016, 2020, 2030, 2035, and 2050.

Table 16 Off-Road Vehicles Legislative-Adjusted Business-As-Usual Emissions Forecasts (2016-2050) ($MTCO_2e$/year)

Source	2016	2020	2030	2035	2050
Off-Road Vehicles	11,741	12,580	15,237	16,755	19,781

Notes: $MTCO_2e$ = metric tons of carbon dioxide equivalent.
Source: Data compiled by Ascent Environmental in 2019.

2.1.6 Discussion

As discussed above and shown in Figure 1 and Table 5, the City's legislative-adjusted BAU emissions would decrease by two percent between 2016 and 2020. This is a result of anticipated growth, despite reductions that would result from the following:

- A greater renewable mix in California's electricity supply (33 percent by 2020);
- Building energy efficiency through compliance with 2019 Title 24 standards (53 percent energy reduction for residential, 30 percent for non-residential);
- Water consumption reduction of 20 percent by 2020 through compliance with SBX7-7;
- Reductions in on-road vehicle emission factors forecasted in EMFAC 2017; and
- Achieving the waste diversion goal of 75 percent, pursuant to AB 341.

From 2020 to 2035, the City's legislative-adjusted BAU emissions would decrease by 3 percent. This is a result of anticipated growth, despite reductions that would result from the following:

- A greater renewable mix in California's electricity supply (60 percent by 2030);
- Building energy efficiency through compliance with 2019 Title 24 standards (53 percent energy reduction for residential, 30 percent for non-residential);
- Water consumption reduction of 20 percent by 2020 through compliance with SBX7-7;
- Reductions in on-road vehicle emission factors forecasted in EMFAC 2017; and
- Maintaining waste diversion goal of 75 percent, pursuant to AB 341.

From 2030 to 2050, new or updated legislative actions that might be put into place by the State or federal government are not known at this time. Thus, the City's projected growth would outpace reductions from existing legislative actions. The main legislative reductions beyond 2030 known at this time would come from SB 100's target of 100 percent of electricity from renewable or zero-carbon sources by 2045 for all electricity providers. Other minor additional reductions would be in forecasted improvements in vehicle fuel economy and increased VMT share of EVs (3.3 percent of vehicles in Riverside County by 2050), as estimated in the EMFAC 2017 model. Existing legislative actions that reduce emissions are assumed to continue to apply from 2030 to 2050 but would not outpace projected growth in population and jobs in that timeframe.

3 GREENHOUSE GAS EMISSION REDUCTION TARGETS

3.1 REDUCTION TARGETS

As directed in AB 32, SB 32, EO B-30-15, EO S-3-05, and CARB's 2017 Climate Change Scoping Plan (Scoping Plan), the State aims to reduce statewide annual GHG emissions to:

- 1990 levels by 2020 (per AB 32);
- 40 percent below 1990 levels by 2030 (per SB 32 and EO B-30-15); and
- 80 percent below 1990 levels by 2050 (per EO S-3-05).

Because the necessary data are not available to estimate the City's 1990 emission levels, proportional targets for the CAP Update were developed that express the level of GHG emissions reductions that would be needed locally between 2016 and future target years to demonstrate consistency with statewide targets. As stated above, CARB aims to reduce statewide emissions to 1990 levels by 2020, 40 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050, per AB 32, SB 32, and EO B-30-15. However, without a 1990 baseline for the City, the State's targets are translated to be in relation to the State's 2016 emission inventory. This inventory update for 2016 was undertaken due to the availability of higher quality data and the evolution of data collection and emissions quantification methods.

CARB's *2017 Climate Change Scoping Plan* recommends that to be consistent with this statewide goal, local jurisdictions should emit no more than 6 MT CO_2e per capita by 2030 and 2 MT CO_2e per capita by 2050. According to CARB, these per-capita targets are consistent with the State's GHG reduction goals because, when applied to DOF's population forecasts for the state, the per-capita targets reflect a 40 percent reduction in statewide emissions from 1990 levels by 2030 and an 80 percent reduction in statewide emissions from 1990 levels by 2050. These targets are equivalent to the state emitting no more than 265 million MT CO_2e by 2030 and 100 million MT CO_2e by 2050.

According to the inventories available from CARB, Statewide emissions from all sectors were approximately 431 million MTCO2e (MMTCO2e) in 1990 and 429 MMTCO2e in 2016 (CARB 2018). Thus, 2016 Statewide emissions were 2 MMTCO2e (0.37 percent) less than the 1990 level and the State's 2020 GHG target. Consequently, no further reductions from 2016 emissions levels are needed to reach the 2020 target of returning emissions to 1990 levels. Because 2016 emissions are essentially equal to the 1990 emissions level, reduction percentages from 2016 levels needed to meet the State's 2030 and 2050 goals are equivalent to the reductions percentages when measured against 1990 levels: 40 percent by 2030 and 80 percent by 2050. Thus, the post-2020 target for the City that is consistent with the State's goals would be to reduce the City's emissions by 40 percent below 2016 levels by 2030 and 80 percent below 2016 levels by 2050. A 2035 target would be established based on interpolation of the 2030 and 2050 targets.

In order to stay consistent with the State's targets and to account for the City's 2016 inventory, the City's percent-based GHG reduction targets are matched with the state-level reduction targets relative to a 2016 baseline. The GHG emissions reduction targets for the City have been developed using the methodology explained above and shown in Table 17.

The following recommended GHG reduction targets would reduce the City's annual GHG emissions consistent with the State's GHG reduction targets:

- 2020 target: no reductions required;
- 2030 target: 40 percent below 2016 levels (542,686 MTCO2e);
- 2035 target: 50 percent below 2016 levels (452,238 MTCO2e); and
- 2050 target: 80 percent below 2016 levels (180,895 MTCO2e).

Table 17 City of Murrieta Emissions Forecasts and Targets (MT CO_2e/yr)

	2016	2020	2030	2035	2050
BAU Forecast	900,280	900,280	963,647	1,133,343	1,573,729
Percent Change from 2016		7%	26%	36%	75%
ABAU Forecast	900,280	900,280	878,357	815,174	875,589
Percent Change from 2016		N/A	-9%	-9%	-3%
State Reduction Target (percent change from 2016)		-2%[1]	40%	50%	80%
Target Emissions		N/A	542,686	452,238[2]	180,895
Reductions Needed from ABAU Forecast		3,917	272,488	368,549	694,694

Notes: ABAU = legislative-adjusted business-as-usual, BAU = business-as-usual, CO_2e = carbon dioxide equivalents, N/A = Not Available, MT = metric tons

[1] Based on the State's GHG inventory in 1990 and 2016. (CARB 2018).

[2] Interpolated between 2030 and 2050.

Source: Ascent Environmental 2019.

Figure 2 depicts the baseline and legislative-adjusted BAU GHG emission forecasts by sector, as distinguished by colored wedges. The sum of the wedges represents anticipated annual GHG emissions each year. Each wedge shows how an emissions sector is expected to contribute to the City's annual inventory over time. The black line indicates the recommended GHG reduction targets for 2030, 2035 and the longer-term goal for 2050. The additional reductions needed to meet these target to close the expected "gap" between the expected ABAU emission levels and the recommended targets are also apparent in Figure 2. While advances in new technologies and new State policy strategies may allow for additional reductions in the future, legislative reductions that may occur past 2030 are currently unknown. Additionally, many of the State's strategies outlined in the 2017 Scoping Plan either have not yet been implemented or sufficient detail regarding the timing and estimated effectiveness of implementation is not yet available.

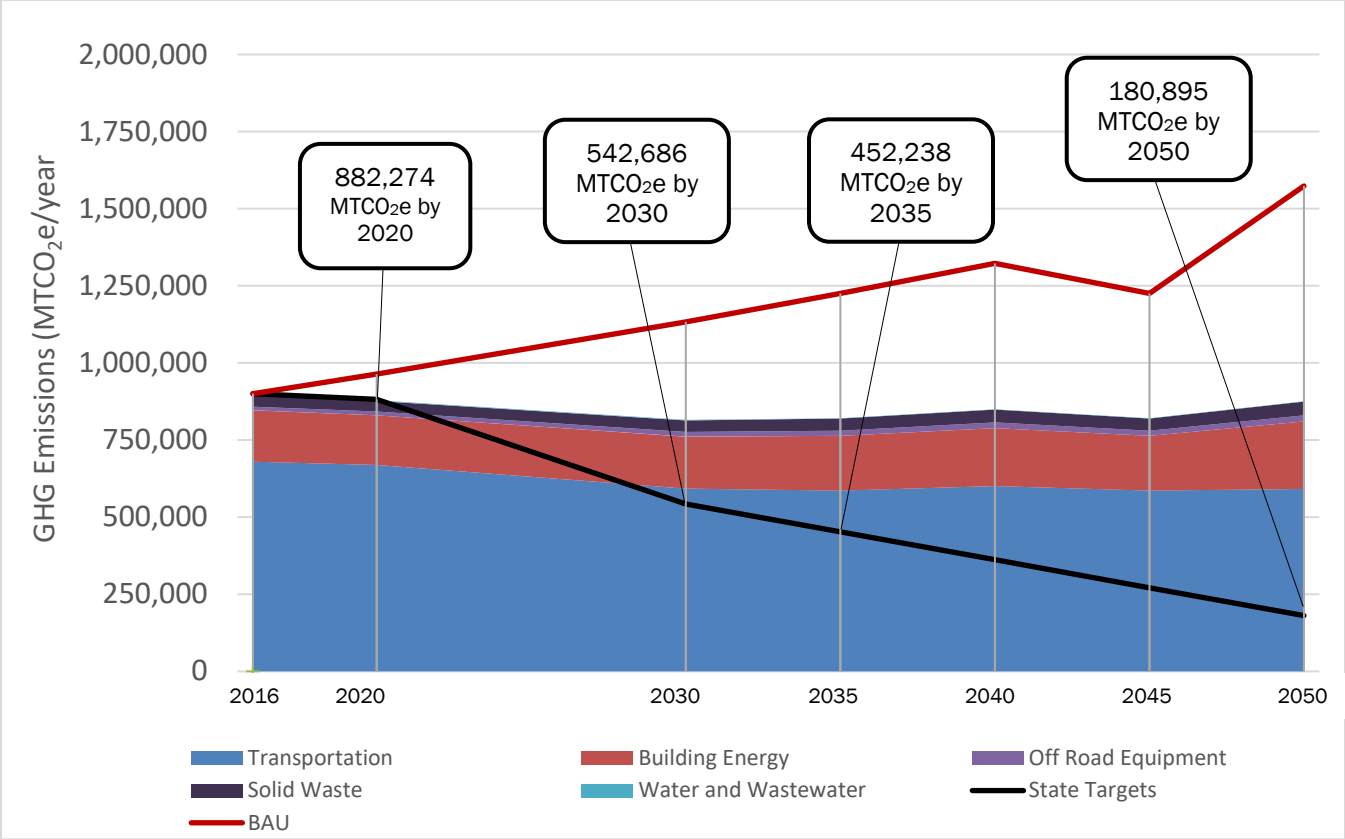


Figure 2 Legislative-Adjusted Business-As-Usual Forecast Emissions by Sector and Recommended Emission Reduction Targets: 2030, 2035, and 2050

A recent California Appellate Court decision, Cleveland National Forest Foundation v. San Diego Association of Governments (November 24, 2014) 231 Cal.App.4th 1056, examined whether EO S-3-05 should be viewed as having the equivalent force of a legislative mandate for specific emissions reductions. The case was reviewed by the California Supreme Court in January 2017 and a decision was released on July 13, 2017. The California Supreme Court ruled that SANDAG did not abuse its discretion by declining to adopt EO S-3-05 as a measure of significance for the specific GHG reduction target years, especially in analyzing the significance of impacts in 2050. Despite this, the California Supreme Court cautioned that future analyses may have a greater capacity to analyze impacts through 2050 and would be required to perform those analyses if that capacity is achievable. Thus, in addition to the other emission reduction targets set in the CAP, the CAP may include analysis of longer-term trends in view of the State's longer-term 2050 goal, as 2050 goals were established in EOs B-30-15 and S-3-05 and referenced in the 2017 Scoping Plan (CARB 2017:99).

4 NEXT STEPS: GHG REDUCTION MEASURES AND GAP ANALYSIS

GREENHOUSE GAS EMISSIONS REDUCTIONS

As discussed in Section 3, while legislative reductions would reduce future emissions and achieve the 2020 GHG reduction target, additional GHG reductions are needed to achieve the recommended GHG reduction targets and goals for 2030, 2035, and 2050.

The 2017 Scoping Plan relies on local action to help achieve statewide GHG reduction targets. As stated in the Scoping Plan, "local efforts can deliver substantial additional GHG and criteria emissions reductions beyond what State policy alone can do, and these efforts will sometimes be more cost-effective and provide more co-benefits than relying exclusively on top-down statewide regulations to achieve the State's climate stabilization goals" (CARB 2017:97). As shown in Table 17 and Figure 2, while the City will not need to reduce emissions to achieve the 2020 target, the GHG reductions required to meet the later targets will require a set of reduction measures with a particular focus on the larger emissions sectors of on-road transportation and building energy.

Next steps in the climate action planning process include (1) working with the City to decide which targets to include in the CAP and (2) developing a set of GHG reduction measures to be included in the CAP that can effectively reduce GHG emissions from the various sectors to achieve the targets established for the CAP.

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CARB. *See* California Air Resources Board.

CEC. *See* California Energy Commission.

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Memo

1230 Columbia Street, Suite 440
San Diego, CA 92101
619.219-8000

Date: November 1, 2019

To: Jarrett Ramaiya and Carl Stiehl, City of Murrieta

From: Kai Lord-Farmer and Poonam Boparai

Subject: City of Murrieta Climate Action Plan Update – Updated Gap Analysis

INTRODUCTION

This memo provides an analysis of annual GHG reductions that would be achieved through the list of Climate Action Plan (CAP) measures that have been discussed with City of Murrieta staff. Table 1 includes a summary of the total GHG reductions achieved through the measures, the proportion of the GHG reduction gap being met by these measures, and additional GHG reductions needed to achieve citywide targets consistent with the State's GHG reduction goals for 2030 and 2050. Table 2 includes the list of GHG reduction measures as well as the GHG reduction potential of each measure for the years 2030, 2035 (General Plan buildout year), and 2050. Table 3 describes the assumptions used to quantify each measure and includes target performance metrics that must be achieved to reduce GHG emissions in line with the City's 2030 and 2035 targets. Many of the performance metrics increase between 2030 and 2035 to achieve the City's 2035 target.

The memo serves as the final analysis of the GHG reduction potential of the list of CAP measures to achieve the City's 2030 and 2035 targets. As shown in Table 1, the City's GHG emissions targets would be achieved for 2030 and 2035 through the set of measures developed for the CAP. The CAP measures work to achieve the reductions necessary to meet the 2030 and 2035 targets while making progress towards the 2050 target. Over the coming decades, new innovations and technologies are anticipated to become available that will enable further GHG reductions and make additional progress towards the 2050 GHG reduction goal. New methods may also become available to quantify measures that are currently unquantifiable. In addition, future federal and State regulations could further reduce emissions in sectors currently addressed primarily by local City measures.

Table 1 City of Murrieta CAP GHG Reduction Gap Analysis (MT CO_2e)

Metric	2030	2035	2050
BAU Forecast	1,133,343	1,225,130	1,573,729
Total ABAU Forecast	815,174	820,787	875,589
City Emissions Targets to achieve consistency with State Targets	542,686	452,238	180,895
Mass Emissions Reduction Target	272,488	368,549	694,694
Total Reductions from Measures	273,748	377,521	542,447
Remaining GHG Reduction Gap	(1,260)	(8,972)	152,246
Percentage of gap achieved through Measures	100%	102%	78%

Notes: Totals may not add due to rounding.
BAU = Business-as-Usual
ABAU = Adjusted-Business-as-Usual
$MTCO_2e$ = metric tons of carbon dioxide equivalent.
Source: Data compiled by Ascent Environmental in 2019.

Table 2 City of Murrieta CAP GHG Reduction Measures

Measure #	Sector	Measure Title	Description	GHG Reductions (MT CO_2e/yr)		
				2030	2035	2050
BE-1	Building Energy	Community Renewable Energy	The City shall create or join a Community Choice Aggregation (CCA) program or create a partnership with SoCal Edison's off-site renewable energy programs (i.e., Green Rate Program), which allows building renters and owners to opt into cleaner electricity sources.	28,306	22,210	0
BE-2	Building Energy	Municipal Renewable Energy	Develop renewable energy generation systems on City-owned property for use in municipal operations.	26	39	0
BE-3	Building Energy	Zero Net Energy Standard	Phase in Zero Net Energy Standard for residential developments by 2030 and nonresidential development by 2035 - Develop and adopt a Zero Net Energy Standard for residential and nonresidential development by 2025 - Begin phase-in of standard beginning in 2025 with standard applying to residential land uses and large nonresidential projects - Fully phase in Zero Net Energy Standard by 2030, requiring all new residential and commercial projects to comply with Zero Net Energy Standard - Fully phase in Zero Net Energy Standard by 2035, requiring all new industrial projects to comply with Zero Net Energy Standard	24,659	50,094	113,303
BE-4	Building Energy	Energy Efficiency and Electrification Program	Work with WRCOG's Western Riverside Energy Partnership to develop and implement a comprehensive electrification and energy efficiency retrofit program focused on the reduction of natural gas use in existing residential and commercial land uses. The program would include the goal of reducing natural gas in existing residential and nonresidential land uses 20% by 2030. - The program would include but not limited to strategies focused on reductions from: o Pool-related energy use (e.g., pool cover rebate program) o Electrification retrofits for natural gas appliances in existing residential and commercial land uses (i.e., hot water heaters, cooktops, heating systems)	33,664	50,800	79,757
LU-1	Land Use	Jobs-Housing Balance Strategy	Encourage flexibility in land use regulations to respond to requirements of new and emerging business and industry types to help create sustainable jobs-housing balance.	10,373	10,418	12,261
LU-2	Land Use	Tree Planting Program	Develop a tree planting program to plant trees throughout the City to increase carbon sequestration.	6,301	12,956	19,612
LU-3	Land Use	Open Space Conservation	Work with the Western Riverside Regional Conservation Authority (RCA) and the Center for Natural Lands Management to implement land use conservation programs for the City. The program would include a minimum acreage of land preserved through conservation easements and, therefore, would not be permitted for future development.	16,095	18,240	20,385

T-1	Transportation	EV Programs	Increase electric vehicles and alternative fuel vehicles to 21% of the City's vehicle mix by 2030 and 23% by 2035 by incentivizing EV purchases and promoting EV ownership for residents and businesses.	82,205	87,335	120,574
T-2	Transportation	EV Programs	Adopt an electric vehicle (EV) charging station ordinance that requires the following for new development: - Installation of one EV charger per single-family housing unit; and - Six percent of total parking spaces require EV charger infrastructure installation for new multi-family projects - Three percent of total parking spaces require EV charger installation for new nonresidential projects	See T-1	See T-1	See T-1
T-3	Transportation	TOD Affordable Housing Program	Prioritize mixed-use and transit-oriented affordable housing projects to achieve the City's affordable housing targets in the SCAG Regional Housing Needs Assessment.	5,036	5,572	7,670
T-4	Transportation	Murrieta Bike Network	Increase the City's bike and pedestrian infrastructure, including implementing the Downtown Murrieta Bike Network, developing comprehensive bike parking standards, and increasing the total percentage of City streets that include bike lanes throughout the City.	367	120	0
T-5	Transportation	Traffic Signalization	Improve traffic flow and reduce traffic congestion by implementing a comprehensive traffic signalization synchronization and update.	1,213	1,265	1,500
T-6	Transportation	Traffic Calming Program	Implement a traffic calming measure program to increase the percentage of City streets and intersections with calming traffic measures.	890	929	3,306
T-7	Transportation	Transportation Demand Management Program	Implement a Citywide TDM Program to reduce communitywide VMT 1. Update Development Code to require employers with 50 or more employees to implement commute trip reduction programs. Commute Trip Reduction Programs voluntary for employees include: - Alternative modes of commuting incentive program (e.g., walking, biking, etc.); - Ride-sharing and preferential parking; - Discounted transit fee program; or - Telecommuting or alternative work schedules 2. Implement a comprehensive ridesharing program targeted at residents working in neighboring cities and long-distance commuters (i.e., San Diego, Los Angeles). 3. Monitor progress annually on TDM program to measure progress towards achieving a nine percent reduction in VMT by 2030 and an 11 percent reduction by 2035.	8,954	11,416	18,373
T-8	Transportation	Transit Network	Work with RTA and WRCOG to expand the transit network in the City and increase service frequency with a priority on expanding services to neighboring cities where Murrieta residents work.	8,659	21,555	25,145
T-9	Transportation	GHG Fee Program	Develop and implement a no-net-increase in GHG emissions threshold for new development projects in the City and develop a GHG Fee Program to offset remaining GHG emissions from new development that cannot	41,357	76,481	108,756

			be achieved through project design features or other CAP measures. As part of implementation of this measure, the City shall: - Adopt a set of strategies to reduce GHG emissions from new development through project-specific mitigation measures (See Implementation Descriptions below for suggestion of potential strategies.) - Develop a process in which the remainder of emissions that cannot be reduced through project-specific measures shall be quantified and offset through a combination of a local emissions offset program to be set up by the City and other offset registry programs(See Implementation Descriptions below for a description of the local emissions offset program.)			
SW-1	Solid Waste	Waste Reduction Program	Encourage recycling or the re-use of materials to reduce the amount of solid waste generated within the City with the goal of achieving a 90% waste diversion rate by 2035.	4,583	7,215	11,120
SW-2	Solid Waste	Construction Waste Diversion	Require all construction projects to exceed CalGreen construction waste diversion requirements by 15 percent.	998	827	686
WW-1	Water	Landscaping and Water Conservation Program	Reduce outdoor water use by 10% at residential, commercial, and public properties by installing efficient irrigation systems and plants with lower watering needs.	55	44	0
WW-2	Water	Rainwater Catchment Program	Encourage property owners to recycle water with rainwater catchment and greywater systems in existing and new developments.	5	4	0

Notes: $MTCO_2e$ = metric tons of carbon dioxide equivalent.
Source: Ascent Environmental 2019.

Table 3 City of Murrieta CAP GHG Reduction Measure Assumptions and Target Metrics

Measure #	Sector	Measure Title	Metric Assumptions	Metric Unit	Measure Target Metrics		
					2030	2035	2050
BE-1	Building Energy	Community Renewable Energy	This measure assumes that the City of Murrieta joins the Western Community Energy. Based on estimates from the CCA feasibility study conducted for Western Community Energy, the measure assumes that 95% of existing and new residential customers opt-in to the CCA and 90% of existing and new nonresidential uses opt-in to the CCA. The measure assumes that customers that do opt-in choose the 100% renewable energy option. Based on other CCAs in California, this is a conservative opt-in rate.	kWh purchased under CCA	468,029,462	478,212,825	555,867,016
				Residential Opt-In Rate	95%	95%	95%
				Nonresidential Opt-In Rate	90%	90%	90%

				Assumed renewable energy mix for CCA customers	100%	100%	100%
BE-2	Building Energy	Municipal Renewable Energy	The measure assumes that the City begins to develop photovoltaic systems on City buildings and property over the next ten years and beyond. The measure assumes that the City offsets 100% of its GHG emissions associated with electricity by 2035 through a combination of on-site solar systems and participation in the CCA.	kWh generated from City Solar Systems	410,289	820,577	820,577
BE-3	Building Energy	Zero Net Energy Standard	This measure assumes that the City begins to develop a Zero Net Energy standard, which is finalized and adopted by 2025. The measure assumes that 75% of residential units and 65% of commercial square footage developed between 2020 and 2030 would comply with the ZNE standard. The measure assumes that 100% of residential units, 100% of commercial projects, and 50% of industrial projects developed between 2030 and 2035 would comply with the ZNE standard beyond 2030, and 100% of industrial projects would comply with the ZNE standard by 2035.	Consumption avoided through ZNE Standard (kWh)	51,356,672	92,086,377	191,901,119
				Consumption avoided through ZNE Standard (Therms)	3,179,444	6,858,463	16,713,800
				New residential units using ZNE Standard	75%	100%	100%
				New commercial sq. ft. developed using ZNE Standard	65%	100%	100%
				New industrial Sq. Ft. developed using ZNE Standard	50%	50%	100%
BE-4	Building Energy	Energy Efficiency and Electrification Program	This measure assumes that the City will develop and implement a comprehensive energy efficiency retrofit and appliance electrification program, focused on reducing natural gas use in existing land uses through appliance upgrades, weatherization upgrades, and other energy efficiency measures.	Percent reduction in natural gas use in existing residential, commercial, and industrial land uses	20%	25%	25%
LU-1	Land Use	Jobs-Housing Balance Strategy	This measure assumes the number of jobs within the City and within a 30-mile radius of the City increases in the future and therefore results in commute-related VMT reductions for residents.	Percent increase in jobs available within a 30-mile radius	30%	35%	35%
LU-2	Land Use	Tree Planting Program	This measure assumes the City develops a program to plant trees for carbon sequestration and other co-benefits, planting an assumed average number of trees per year.	Average number of trees planted per year	750	800	800
LU-2	Land Use	Open Space Conservation	This measure assumes that a certain number of acres in the City limits is preserved as open space resulting in carbon sequestration. The measure assumes that this land would otherwise be cleared for development and, if done, would result in a net decrease in sequestration potential.	Number of acres preserved	200	150	150

T-1	Transportation	EV Programs	This measure assumes that through the City's efforts to incentivize EV adoption among residents, the percentage of EV and Zero Emissions Vehicles (ZEVs) increase in the City to above levels that are already projected to occur under a ABAU scenario.	Percentage of citywide vehicle mix that are EVs or ZEVs	21%	23%	31%
T-2	Transportation	EV Programs	This measure assumes that the City will adopt an ordinance that requires new development to have a certain level of EV infrastructure in place as part of the project. The reductions achieved from this measure is combined with T-1.	Percent of new SFU with charging stations	100%	100%	100%
				Percent of new MFU parking spaces with charging stations	6%	6%	6%
				Percent of parking spaces in nonresidential land uses with charging stations	3%	3%	3%
T-3	Transportation	TOD Affordable Housing Program Murrieta Bike Network Traffic Signalization	This measure assumes that the City focuses on developing mixed-use, transit-oriented affordable housing projects in the future. The measure assumes that the City locates these projects in areas that encourage trips made by walking, biking, and transit and keeps pace with City's Regional Housing Needs Assessment goals for affordable housing units in the City.	Number of transit-oriented affordable housing units built	1,573	787	2,360
T-4	Transportation	Murrieta Bike Network	This measure assumes that the City continues to develop the City's bike network, and the percentage of streets in Murrieta with bike lanes continues to increase over time.	Percent of citywide street length with bike lanes	19%	38%	51%
T-5	Transportation	Traffic Signalization	This measure assumes the City conducts a comprehensive upgrade of the traffic signal system to improve traffic flow and relieve traffic congestion, particularly during periods of commute congestion periods. This measure assumes that fuel consumption associated with commute-related VMT in the City will decrease by 9% as a result of improving traffic signalization.	Transportation fuel reduced by improving traffic signalization (Gallons of Gasoline)	138,146	144,091	170,831
T-6	Transportation	Traffic Calming Program	This measure assumes that the City continues to implement traffic calming measures on City streets and intersections to reduce traffic speeds and reduce cut-through traffic and assumes a certain percentage of streets and intersections will include traffic calming measures by a certain year.	Percent of intersections with traffic calming improvements	25%	25%	50%
				Percent of streets with traffic calming improvements	25%	50%	50%

T-7	Transportation	Transportation Demand Management Program	This measure assumes that the City implements a comprehensive TDM program that requires new large employers to offer TDM options and incentives to employees as well as providing commute services and support (e.g., rideshare, telework) for residents who work outside the City. The measure assumes a certain percentage of commute-related VMT reduction by target years.	Percent of commute-related VMT reduced	9%	11%	15%
T-8	Transportation	Transit Network	This measure assumes that the City works with RTA and other regional partners to expand the transit network in the City and increase the frequency of service of existing transit services.	Percent reduction in citywide VMT	2.5%	6%	6%
T-9	Transportation	GHG Fee Program	This measure assumes the City develops, as part of the City's forthcoming CAP Consistency checklist or other development review process, a program to reduce and offset GHG emissions associated with new development projects. The measure assumes emissions reductions and offsets can be tracked and quantified to ensure compliance with the measure.	Percent of project emissions reduce through program	50%	50%	50%
SW-1	Solid Waste	Waste Diversion	This measure assumes that the City works to meet the waste diversion targets set by CalRecycle for specific target years. The reductions associated with this measure have been included in the ABAU forecast as part of the legislative reductions.	Percent of waste diverted from landfills	85%	90%	95%
SW-2	Solid Waste	Construction Waste Diversion	This measure assumes that the City implements a policy, as part of the City's forthcoming CAP Consistency checklist or other development review process, to require all construction projects to exceed CalGreen construction waste diversion requirements by 15 percent.	Percent of construction waste	65%	65%	65%
WW-1	Water	Landscaping and Water Conservation Program	This measure assumes that City implements a policy to reduce outdoor water use from various land uses by installing efficient irrigation systems, using plants with lower watering needs, and promoting water conservation. The measure assumes that Citywide water use is reduced by a certain percent by target years.	Percent reduction in citywide water use	10%	10%	10%
WW-2	Water	Rainwater Catchment Program	This measure assumes that the City develops and implements a program to increase recycled water use by residents through the use of with rainwater catchment and greywater systems in existing and new developments	Percent reduction in citywide water use	1%	1%	1%

Notes: $MTCO_2e$ = metric tons of carbon dioxide equivalent.
kWh = kilowatt-hour; VMT= vehicle miles traveled
SFU= single-family unit; MFU= multi-family unit
Source: Ascent Environmental 2019.

IMPLEMENTATION DESCRIPTIONS FOR KEY MEASURES

The following section includes a description of how key CAP measures would be implemented and specific steps that should be taken to successfully implement the measure.

BE-1 - COMMUNITY RENEWABLE ENERGY

The Western Community Energy Program (WCE) is a program established in 2018 to implement a Community Choice Aggregation (CCA) program for jurisdictions in western Riverside County. WCE's primary objectives are to provide local control in rate-setting for customers, provide overall rates that are lower and/or competitive with those offered by SCE, expanded options for economic development, and supply an energy portfolio that will use local and/or regional renewable resources. During Phase 1, beginning in 2020, WCE anticipates serving approximately 114,000 out of 120,500 residential and nonresidential accounts. Alongside serving as an energy provider, WCE also intends to develop an energy program to provide support for WCE customers conducting energy efficiency and renewable energy-related projects. It is anticipated that these programs could help in the implementation of other CAP measures (BE-4). Details regarding the development, governance, and operations of WCE can be found here in the Western Community Energy Implementation Plan.

Implementation Items

- Research existing CCA programs in California to understand how the programs operate and what success they have achieved.
- Work in collaboration with WRCOG and WCE to discuss the details and requirements in joining WCE, including the potential need for a feasibility study, costs and timeline for, and anticipated rates.
- Explore developing an alternative program with SCE to increase the purchase of renewable energy by residents and businesses that can achieve the GHG reductions quantified for the measure (BE-1).

BE-2 - MUNICIPAL RENEWABLE ENERGY

Through this measure, the City has the opportunity to demonstrate leadership by developing renewable energy systems for municipal operations. By increasing the City's renewable energy generation, the City can achieve long-term cost savings and increase the resilience of the City's municipal energy supply during power outages. WRCOG's Energy Department offers support, services, and access to financing for local jurisdictions who are conducting energy efficiency and renewable energy projects at municipal facilities.

Implementation Items

- Conduct audits at municipal facilities to quantify energy use and to identify and quantify energy efficiency and conservation opportunities.
- Based on energy audits, develop a list of energy efficiency and renewable energy projects the could be implemented as well as an implementation plan and timeline for the development of the projects.
- Identify grants, rebate and incentive programs (WRCOG program), and financing opportunities for municipal energy efficiency and renewable energy.

BE-3 - ZERO NET ENERGY STANDARD

This measure focuses on developing a Zero Net Energy (ZNE) Standard for new residential and nonresidential projects in the City, with requirements phased in over time between 2020 and 2030. Beginning in approximately 2013, the California Energy Commission and California Public Utilities

Commission begun discussions of phasing in a ZNE standard for new construction in California. Since then, the State has been taking significant steps to phase in a standard, including the development of California's Zero Net Energy Action Plan and, most recently, the 2019 Energy Efficiency Standard Update, which requires solar installations for all single-family and low-rise multi-family homes. This measure is intended to help the City keep pace as the State moves closer to a ZNE standard for all new development and get ahead of the curve of anticipated changes to come.

Implementation Items

- Research California's Zero Net Energy Action Plan and other ZNE resources, including other ZNE standards that have been adopted by California cities (e.g., San Jose).
- Identify potential funding opportunities, technical support, resources in helping to develop a ZNE standard for both residential and nonresidential uses.
- Develop ZNE standard and detailed timeline for implementation of the standard for different land uses.
- Identify forthcoming residential development projects that could potentially serve as a case study for early adoption of the City's ZNE standard

BE-4 - ENERGY EFFICIENCY AND ELECTRIFICATION PROGRAM

This measure focuses on developing a comprehensive electrification and energy efficiency retrofit program focused on the reduction of natural gas use in existing residential and commercial land uses. The program would include multiple components, in collaboration with regional partners, focusing on various aspects of energy conservation, energy efficiency, and building electrification. These programs would likely include:

- An energy conservation marketing campaign to achieve energy cost savings through conservation practices and tools to help monitor and lower energy use.
- An energy efficiency assessment and retrofit program to help residents and businesses assess energy efficiency opportunities and incentives for energy efficiency upgrades.
- An appliance retrofit program focused on upgrading to all-electric appliances in existing buildings (i.e., water heaters, cooktops, heating systems, pool heating systems) but would also include energy efficient electric appliances (e.g., refrigerators, televisions).

Implementation Items

- Work with WRCOG and WCE to discuss opportunities for collaboration and support in implementing the City's Energy Efficiency and Electrification Program including opportunities to share data and resources.
- Conduct research regarding the implementation of similar programs in other California cities and agencies. Develop an implementation timeline and plan for the development of the program with assistance from WRCOG and WCE when appropriate.
- Develop Energy Efficiency and Electrification Program and set internal targets for energy reductions that are consistent with the estimate used to quantify this measure.

LU-1 - JOBS-HOUSING BALANCE STRATEGY

This measure is intended to support the City in achieving a sustainable jobs-housing balance by implementing strategies to attract new employers to the City and the surrounding region and, as a result, reducing commute related VMT for residents and improving quality of life. This measure requires that the City exercise flexibility in land use regulations to respond to requirements of new and emerging business and

industry types as well as ensuring the regulatory environment in the City remains attractive to large employers looking to locate in the City.

Implementation Items

- Research strategies to update the City's development code to ensure flexibility in building standards when working with large employers who are considering locating in the City.
- Work with WRCOG, SCAG, and the Murrieta Chamber of Commerce to understand the growth population and employment characteristics in the region and opportunities to create a sustainable jobs-housing balance for residents.
- Adjust the development code and long-term nonresidential land use development strategy in the City to ensure the City is taking advantage of regional growth opportunities in key employment sectors and industries.

T-1 AND T-2 – ELECTRIC VEHICLE PROGRAMS

This measure is focused on increasing the number of EVs and ZEVs to achieve a higher percentage of vehicles in the City being EVs and ZEVs than what is currently projected for Riverside County. The City can provide an environment conducive to EV adoption and help remove barriers to help increase EV adoption rates. T-1 focuses on promoting and increasing EV ownership in the City and would include several components that would together create a comprehensive program. The program would include:

- An educational component to conduct outreach and educate residents about the benefits of EV ownership
- A marketing component to educate residents on current incentives and rebates available for purchasing an EV and installing residential EV Charging equipment
- Updates to the City's development code to incentivize the installation of EV chargers in new and existing land uses
- An incentive program for the purchase of EVs and ZEVs for City residents potentially funded through the GHG Mitigation Fee Program (T-9)

T-2 focuses on developing and adapting an EV Infrastructure ordinance to ensure that new development in the City includes adequate equipment EV charging infrastructure to keep pace with the City's increased EV adoption rates.

Implementation Items

- T-1
  - Research other cities and agencies (e.g., Pasadena) that have implemented similar programs in California and adopt components of programs that are appropriate for the development of the City program.
  - Work with Transportation Network Companies (e.g., Uber and Lyft) to promote EV adoption amongst drivers, promoting the benefits of EV's unique to drivers (e.g., lower maintenance costs, lower fuel costs).
  - Work with the South Coast Air Quality Management District, SCAG, and WRCOG to discuss potential opportunities for collaboration in implementing the program. Develop an implementation plan and timeline for implementing the program by 2023.
- T-2
  - Research other jurisdictions which have adopted EV ordinances to increase EV charging infrastructure (e.g., Menlo Park).
  - Develop and adopt an EV ordinance to require appropriate levels of EV charging in new residential and nonresidential uses in the City.

- Promote available incentives for EV charging infrastructure to residents and developers in the City.

T-7 – TRANSPORTATION DEMAND MANAGEMENT PROGRAM

This measure is focused on reducing commute-related VMT generated by new large employers in the City and the region. The measure would build on the City's existing Transportation Demand Management process in place to increase resources and support available to employers to help implement employer base TDM programs and increase resources to City to manage and monitor progress of the TDM Program. Given that the City is focused on attracting new employers to develop a sustainable jobs-housing balance, the TDM measures included in the program would be designed to be conducive to development and attractive to employees to reduce commute costs and time. The TDM measures established as part of the program can be included in the City's CAP Consistency Checklist to effectively streamline this measure into the City's development process for new projects. The TDM Program measures could include, but are not limited to:

- A comprehensive marketing program targeted at employees to promote the benefits (health, cost savings) of low-GHG commute modes (e.g., walking, biking, transit, telecommuting, etc.);
- Requirements for short and long-term bicycle parking facilities including on site-amenities (e.g., showers, locker rooms);
- Incentives for using alternative modes (e.g., transit pass subsidies, carpool, parking cash-out program);
- a vanpool program for residents with longer commutes outside the City;
- A ride-matching and ride-sharing program for both employees working in the City and for residents who commute to regions outside the City (e.g., San Diego, Los Angeles);
- A telecommuting program to promote telecommuting for large employers in the City as well as advocating for telecommuting practices in the larger region with support from WRCOG; and
- A monitoring program to track progress on the VMT reductions achieved through the TDM program.

Implementation Items

- Research other cities and agencies in the region conducting comprehensive TDM Programs and adopt components of programs that are appropriate for development in the City's expanded program.
- Work with WRCOG and other regional partners to discuss potential collaboration in implementation components of the TDM Program.
- Develop TDM Program Implementation Plan and hire a Transportation Demand Management coordinator to implement the TDM Program.
- Adopt a TDM Program ordinance that would apply to specific types of new development in the City and help reduce VMT generate from new projects. This ordinance can be implemented, in part, through the City's CAP Consistency Checklist.

T-9 – GHG MITIGATION FEE PROGRAM FOR NEW DEVELOPMENT

This measure is intended to reduce GHGs from new development in the City, particularly, but not exclusive to, GHG emissions associated with VMT generated by new residential and nonresidential development in the City. As part of the measure, the City would develop a program to mitigate a certain percentage of GHG emissions from new development through a fee-based program that would offset emissions through development of local mitigation projects. The total fee for different new development projects would be calculated based on key characteristics of the project (e.g., land use type, size) to estimate the anticipated GHG emissions of the project, similar to other impact fee programs (e.g., transportation impact fees).

Applicants would then pay into a fee program for the project's GHG emissions that cannot be mitigated through other CAP measures. Mitigation projects funded through the program would give priority to implementing local projects to reduce emissions in the City and then, once local options are exhausted, through a mitigation bank to contribute to larger mitigation projects (e.g., large transit projects). A key next step for the City in implementation of this measure would be to conduct a more in-depth analysis to price the fee appropriately and how the fee program would be structured for successful implementation. Types of mitigation projects to be funded through the program could include:

- Funding of TDM measures which would result in GHG emissions reductions (e.g., transit pass subsidies, car-sharing program)
- Funding of larger transit projects which demonstrate VMT reductions and GHG emissions
- Appliance replacement programs to replace natural gas appliances with electric appliances
- Vehicle replacement programs to incentivize the purchase of EVs and ZEVs for residents and businesses

Implementation Items

- Research VMT Mitigation and Banking Programs including information in UC Berkeley's Technical Report "Implementing SB 743: An Analysis of Vehicle Miles Traveled Banking and Exchange Frameworks" .
- Develop a comprehensive list of strategies, projects, and other opportunities to reduce GHG emissions which can be funded and implemented through the program.
- Choose or design the most appropriate framework for developing a GHG Mitigation Fee Program and incorporate the program into the City's development and environmental review processes.

Development Services
Planning Division
1 Town Square
Murrieta, CA 92562
951-461-6061
www.murrietaca.gov

CLIMATE ACTION PLAN CONSISTENCY CHECKLIST INTRODUCTION

The City of Murrieta has prepared a Climate Action Plan (CAP) that outlines actions that the City will undertake to achieve its proportional share of State greenhouse gas (GHG) emissions reductions. The purpose of the CAP Consistency Checklist (Checklist) is to, in conjunction with the CAP, provide a streamlined review process for proposed new development projects that are subject to discretionary review and trigger environmental review pursuant to the California Environmental Quality Act (CEQA).

Analysis of GHG emissions and potential climate change impacts from new development is required under CEQA. The CAP is a plan for the reduction of GHG emissions in accordance with CEQA Guidelines Section 15183.5. Pursuant to CEQA Guidelines Sections 15064(h)(3), 15130(d), and 15183(b), a project's incremental contribution to a cumulative GHG emissions effect may be determined not to be cumulatively considerable if it complies with the requirements of the CAP.

This Checklist contains measures that are required to be implemented on a project-by-project basis to ensure that the specified emissions targets identified in the CAP are achieved. Implementation of these measures would ensure that new development is consistent with the CAP's assumptions for relevant CAP strategies toward achieving the identified GHG reduction targets. Projects that are consistent with the CAP as determined through the use of this Checklist may rely on the CAP for the cumulative impacts analysis of GHG emissions. Projects that are not consistent with the CAP must prepare a project-specific analysis of GHG emissions, including quantification of existing and projected GHG emissions and incorporation of the measures in this Checklist to the extent feasible.

The Checklist may be periodically updated to incorporate new GHG reduction techniques, to comply with later amendments to the CAP, or to reflect changes in local, State, or federal laws, regulations, ordinances, and programs.

APPLICATION SUBMITTAL REQUIREMENTS

- The Checklist is required only for projects subject to CEQA review. The diagram below shows the context for the CAP Consistency Checklist within the planning review process framework.
- If required, the Checklist must be included in the project submittal package. Application materials and submittal procedures can be found on the City of Murrieta website here. This checklist is designed to assist the applicant in identifying the minimum CAP-related requirements specific to their project. However, it may be necessary to supplement the completed checklist with supporting materials, calculations or certifications, to demonstrate compliance with CAP requirements.
- The requirements in the Checklist will be included in the project's conditions of approval.
- The applicant must provide an explanation of how the proposed project will implement the requirements described herein to the satisfaction of the Planning Division.
- If a question in the Checklist is deemed not applicable to a project, an explanation must be provided to the satisfaction of the Planning Division.

DRAFT

Application Information

Contact Information

Project No./Name: _____

Property Address/APN: _____

Applicant Name/Co.: _____

Contact Phone: _____ Contact Email: _____

Was a consultant retained to complete this checklist? ☐ Yes ☐ No If Yes, complete the following

Consultant Name: _____ Contact Phone: _____

Company Name: _____ Contact Email: _____

Project Information

1. What is the size of the project (acres)? _____
2. Identify all applicable proposed land uses:
   - ☐ Residential (indicate # of one- and two-family units): _____
   - ☐ Residential (indicate # of multi-family units): _____
   - ☐ Commercial (indicate total square footage):
   - ☐ Hotel (indicate # of rooms): _____
   - ☐ Industrial (indicate total square footage): _____
   - ☐ Other (describe): _____
4. Provide a brief description of the project proposed: _____

_____

_____

_____

CAP CONSISTENCY CHECKLIST QUESTIONS

STEP 1: LAND USE CONSISTENCY

The first step in determining CAP consistency for discretionary development is to assess the project's consistency with the growth projections used in the development of the CAP. This section allows the City to determine a project's consistency with the land use assumptions used in the CAP. Projects found not to be consistent with the CAP's land use assumptions will be subject to a project-specific analysis of GHG emissions' impact on the environment in accordance with the requirements of the CEQA. This may result in GHG-reducing mitigation measures applied as a condition of project approval, including where feasible the measures listed in Step 2 of this checklist.

Step 1: Land Use Consistency		
Checklist Item **(Check the appropriate box and provide explanation and supporting documentation for your answer)**	**Yes**	**No**
1. Are the proposed land uses in the project consistent with the existing General Plan land use and zoning designations? If "Yes", questions 2 below is not applicable and the project shall proceed to Step 2 of the checklist. If "No", proceed to Question 2 below.	☐	☐
2. If the proposed project is not consistent with the General Plan land use or zoning designations, does the project include a land use plan and/or zoning designation amendment that would result in an equivalent or less GHG-intensive project when compared to the existing designations? If "Yes", attach to this checklist the estimated project emissions under both existing and proposed designation(s) for comparison. Compare the maximum buildout of the existing designation and the maximum buildout of the proposed designation. If the proposed project is determined to result in an equivalent or less GHG-intensive project when compared to the existing designations, proceed to Step 2 of the checklist. If "No", the applicant must conduct a full GHG impact analysis for the project as part of the CEQA process. The project shall incorporate each of the applicable measures identified in Section C to mitigate cumulative GHG emissions impacts.	☐	☐

STEP 2: CAP MEASURES CONSISTENCY

The second step of the CAP consistency review is to review and evaluate a project's consistency with the applicable strategies and actions of the CAP. Step 2 only applies to development projects that involve permits that may require a certificate of occupancy from the Building Official.[1] All applicable Checklist questions must be answered "Yes", and documentation provided, where necessary, that substantiates how compliance would be achieved. For measures for which a "Yes" is indicated, the features must be demonstrated as part of the project's design and described. All applicable requirements in the Checklist will be included in the conditions of approval.

If any questions are marked with a "No", the project cannot be determined to be consistent with the CAP, and project specific GHG analysis would be required as part of the CEQA process. If any questions are marked "N/A" (meaning "not applicable"), a statement describing why the question is not applicable shall be provided to the satisfaction of the Planning Division or building official.

Step 2: CAP Strategies Consistency			
Checklist Item (Check the appropriate box and provide explanation for your answer)	Yes	No	N/A
1. Zero Net Energy Standards (Measure BE-3)			
a) For residential projects, would the project or a portion of the project be subject to building permitting (i.e., building permits issued) on or after January 1, 2023? b) For commercial projects or commercial portions of mixed-use projects, would the project or a portion of the project be subject to building permitting (i.e., building permits issued) on or after January 1, 2025? c) For industrial projects, would the project or a portion of the project be subject to building permitting (i.e., building permits issued) on or after January 1, 2025? If "Yes" to either a, b, or c, proceed to question d of this checklist requirement.	☐	☐	☐
d) Would the project or portions of the project permitted after January 1, 2023 for residential projects and after January 1, 2025 for nonresidential projects be designed and constructed to comply with the Zero Net Energy standard[2]?	☐	☐	☐
2. Construction Waste Diversion (Measure SW-2)			
a) For residential projects, recycle and/or salvage for reuse a minimum of 80 percent of the nonhazardous construction and demolition waste in accordance with either Section 4.408.2, 4.408.3 or 4.408.4 of the California Code of Regulations, Title 24? b) For nonresidential projects, recycle and/or salvage for reuse a minimum of 80 percent of the nonhazardous construction and demolition waste in accordance with either Section 5.408.1.1, 5.408.1.2 or 5.408.1.3 of the California Code of Regulations, Title 24?	☐	☐	☐

[1] Actions that are not subject to Step 2 would include, for example: 1) discretionary map actions that do not propose specific development; 2) permits allowing wireless communication facilities; 3) special events permits; 4) conditional use permits that do not result in the use intensification or expansion of an existing building; and 5) non-building infrastructure projects such as roads and pipelines. Because such actions would not result in new occupancy buildings from which GHG emissions reductions could be achieved, the items contained in Step 2 would not be applicable.

[2] Although the City has not yet developed a Zero Net Energy standard, the City will develop such a standard prior to January 1, 2023, pursuant to Measure BE-3 in the CAP. For purposes of CAP compliance, all new residential projects that include phases for which building permitting would begin after January 1, 2023, compliance with zero net energy standard as stated herein must be included as a condition of approval and included as a mitigation measure in the project's environmental document (as applicable). For all new commercial projects, commercial portions of mixed-used projects, and industrial projects that include phases for which building permitting would begin after January 1, 2025, projects must demonstrate compliance with zero net energy standard. Such projects or phases thereof, to meet the zero net energy standard, must achieve a Total Energy Design Rating (Total EDR) and Energy Efficiency Design Rating (Efficiency EDR) of zero, consistent with the standards in Title 24, Part 6 of the California Code of Regulations, by the date established above for each land use type.

Step 2: CAP Strategies Consistency			
Checklist Item **(Check the appropriate box and provide explanation for your answer)**	**Yes**	**No**	**N/A**
3. Transportation Demand Management Program (Measure T-7)			
a) For the construction of nonresidential projects that would include 50 or more employees, would the project include a transportation demand management plan that meets requirements of Section 16.40 "Transportation Demand Management" of the City's Municipal Code has been reviewed and approved by the City of Murrieta Public Works Department? Check "N/A" if the project is a residential project or if it would include 49 or fewer employees.	☐	☐	☐
4. Electric Vehicle Service Equipment (EVSE) (Measure T-2)[3]			
Checklist Requirement by Project Type: a) <u>One- and two-family dwellings and townhouses with attached private garages:</u> Would the required parking serving each new dwelling include Electric Vehicle Service Equipment (EVSE) to allow for electric vehicle charging by the resident(s)? b) <u>Multi-Family Residential Projects:</u> Would 6% of the total parking spaces required, or a minimum of two spaces, whichever is greater, include Electric Vehicle Service Equipment (EVSE) to allow for electric vehicle charging by the resident(s)? c) <u>Non-residential projects</u>: Would 3% of the total parking spaces required, or a minimum of two spaces, whichever is greater, include Electric Vehicle Service Equipment (EVSE) to allow for electric vehicle charging by the resident(s)?	☐	☐	☐

[3] For the purpose of this Checklist, EVSE is defined by Article 625 of the California Electrical Code.

Memo

455 Capitol Mall, Suite 300
Sacramento, CA 95814
916.444-7301

Date: September 7, 2018

To: Paul Swancott (City of Murrieta)

From: Ricky Williams, Poonam Boparai, and Honey Walters

Subject: City of Murrieta Climate Action Plan Technical Memorandum: Climate Change Vulnerability Assessment

INTRODUCTION

Climate change is a global phenomenon that has the long-term potential to cause a variety of consequences, including detrimental impacts on human health and safety, economic continuity, water security, provisions of basic services, and economic function (California Natural Resources Agency [CNRA] 2012). The effects of climate change will continue to impact the physical environment throughout California, Riverside County, and the City of Murrieta (City). The magnitude and timing of climate change effects will vary by location; therefore, it is important to identify the projected severity of these impacts specific to the City. The first step in adapting to climate change is to analyze these impacts and the vulnerabilities they create.

In accordance with Senate Bill (SB) 379, this Vulnerability Assessment follows the recommended format and methods described in the most recent Cal-Adapt tool and California Adaption Planning Guide. SB 379 requires that jurisdictions update their safety elements and local hazard mitigation plans, as necessary, to address climate adaption and resiliency strategies. The update is required to include a set of goals, policies, and objectives based on a vulnerability assessment.

CLIMATE CHANGE ADAPTATION PLANNING PROCESS

The California Adaption Planning Guide (APG), developed by California Governor's Office of Emergency Services (Cal OES) and CNRA, helps communities throughout California plan for and adapt to the impacts of climate change. The APG includes a nine-step process, illustrated in Figure 1, which allows communities to assess their specific climate vulnerabilities and provides strategies for communities to reduce climate-related risks and prepare for current and future impacts of climate change.

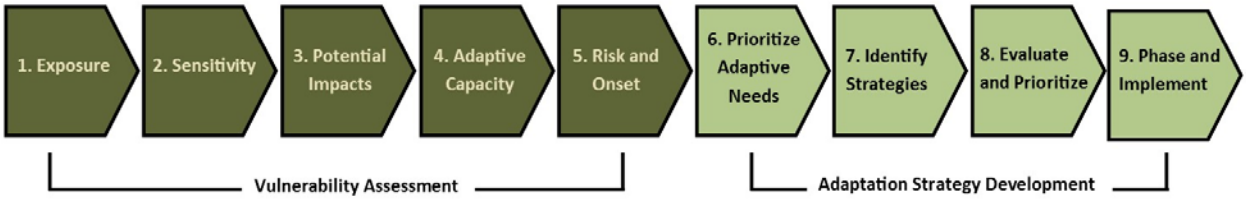

Figure 1: The Nine Steps in the Adaptation Planning Process

The first phase of the nine-step process focuses on preparing a Vulnerability Assessment, which is a method for determining the anticipated impacts of climate change on community assets and populations. This phase evaluates a community's level of exposure to climate-related impacts and analyzes how these impacts will affect a community's populations, functions, and structures. The second phase of the process uses the information gathered in the Vulnerability Assessment to develop adaption strategies and measures to help the community prepare for, respond to, and adapt to local climate change impacts. The strategies support a collaborative planning process that involves a variety of City departments and State agencies, including, but not limited to Cal OES, CNRA, and the California Department of Public Health (CDPH). This memorandum follows APG's nine-step process and includes a Vulnerability Assessment, identifying key climate-related risks faced by the City.

1 VULNERABILITY ASSESSMENT

This Vulnerability Assessment for the City involves the first five steps in the adaption planning process. Based on the work of International Panel on Climate Change (IPCC) and research conducted by the State and partner agencies and organizations, climate change is already affecting the City (as described in the following sections) and will continue to further in the future.

1.1 STEP 1: EXPOSURE

The effects of climate change can be described in terms of primary exposure to various physical changes in the climate and environment caused by global climate change, such as temperature, precipitation, and sea level rise. Secondary consequences, such as reduced water supply, impacts on structures from erosion and sea-level rise, increased frequency and duration of heat waves, and increased fire risk, occur as a result of one or a combination of these primary effects (California Governor's Office of Planning and Research (OPR) 2018).

The impact of climate change in California varies across the state due to diversity in biophysical setting, climate, and jurisdictional characteristics. The Desert Region, as designated by CNRA includes San Bernardino, Riverside, and Imperial Counties. The Cal-Adapt tool, developed by the California Energy Commission (CEC) and University of California (UC) Berkeley is used to project the impacts of climate change at a local and regional level. This tool provides climate change-related projections for a variety of impacts including maximum and minimum temperature and precipitation, extreme heat days and warm nights, snowpack, sea level rise, wildfire risk, and streamflow. These impacts are projected for two scenarios: High-Emissions Scenario, which assumes that emissions will continue to rise through 2050 and plateau in 2100, then decline, and Low-Emissions Scenario, which assumes emissions will peak around 2040, then decline. Because the degree of effectiveness of programs implemented to reduce GHG emissions is not yet known, results from both emissions-scenarios are considered in the Vulnerability Assessment and distinguished, where possible (CEC 2018).

1.1.1 Increased Temperature

Increases in average temperatures can result in multiple negative effects on the built and natural environment. These secondary impacts of increased temperature include increased frequency of extreme heat events and heat waves, and exacerbation of the urban heat island effect. In Riverside County, projected increases in temperatures will be higher further inland and closer to desert regions.

Annual temperatures in the City are projected to increase steadily under both Low- and High-Emissions scenarios. The City's historical average annual maximum and minimum temperatures, based on data from 1950 to 2005, are 79.8 degrees Fahrenheit (°F) and 47.1 °F, respectively. By 2099 the annual average maximum temperature is projected to increase by 5.1 to 10.4 °F, and the annual average minimum temperature is project to increase by 5.9 to 10.3 °F (CEC 2018). A summary of the historical average and 2050 and 2099 minimum and maximum temperature projections is shown in Table 1.1-1.

Table 1.1-1 Maximum and Minimum Temperatures for the City of Murrieta

	Historical Average (Max/Min)	2050 Projected (Max/Min)	2099 Projected (Max/Min)
Low-Emissions Scenario	79.8°F/47.1°F	84.6°F /51.8°F	84.9°F /53.0°F
High-Emissions Scenario		84.7°F/52.2°F	90.2°F/57.4°F

°F = Degrees Fahrenheit

Source: CEC 2018 data for City of Murrieta Grid Cell (33.59375,-117.21875)

EXTREME HEAT EVENTS AND HEAT WAVES

Increased temperature is expected to lead to secondary climate change impacts, including increases in the frequency, intensity, and duration of extreme heat days and heat waves. Cal-Adapt defines the extreme heat day threshold for the City as 105.1 °F or higher, between April 1st and October 31st. The City historically has averaged five extreme heat days per year between 1950 and 2005. The City is projected to experience an average of 26 to 36 extreme heat days per year by 2050, and 27 to 62 extreme heat days per year by 2099, depending upon the emissions scenario used for projections (CEC 2018).

Heat waves, which can be defined as five or more consecutive extreme heat days, have been historically infrequent in the City, with no more than one heat wave occurring in a year. However, a rise in the frequency of heat waves from two to five heat waves per year by 2050 and two to 11 heat waves per year by 2099 is projected, depending upon the emissions scenario used for projections (CEC 2018).

URBAN HEAT ISLAND EFFECT

Urbanized areas can experience higher temperatures, greater pollution, and more negative health impacts during hot summer months when compared to more rural communities. This phenomenon is known as an urban heat island. Heat islands are created by a combination of heat-absorptive surfaces (such as dark pavement and roofing), heat-generating activities (such as engines and generators), and the absence of vegetation (which provides evaporative cooling). According to the U.S. Environmental Protection Agency (EPA), daytime temperatures in urban areas are on average 1 to 6 °F higher than in rural areas, while nighttime temperatures can be as much as 22 °F higher as the heat is gradually released from buildings and pavement (California Environmental Protection Agency [CalEPA] 2018a).

The CalEPA's Urban Heat Island Index shows urban heat islands in California. The Urban Heat Island Index is calculated as a temperature differential over time between an urban census tract and nearby upwind rural reference points. Local wind patterns dissipate the adverse impacts of urban heat island effects. The index is reported in degree-hours per day on a Celsius scale, as a measure of heat intensity over time. An increase of one degree over an eight-hour period would equal eight degree-hours, as would an increase of two degrees over a four-hour period (CalEPA 2018b). The City generally experiences mild winds from the southwest which provide little relief from the urban heat island effect (National Oceanic and Atmospheric Administration [NOAA] 2018). The heat index for the City is 131.6 degree-hours per day, which is

approximately equal to a 9.9 °F average temperature difference between the City and nearby rural areas (CalEPA 2018b).

1.1.2 Changes in Precipitation Patterns

The City's water supply comes from local sources of groundwater and surface water, imported water from the Metropolitan Water District's Colorado River Aqueduct and the State Water Project, recycled water reclamation facilities, and water transfers and exchanges (City 2011). Increased temperatures, particularly in the Sierra Nevada region, which supports the State Water Project, as well as the Rocky Mountains, which heads the Colorado River, will lead to earlier and faster snowmelt and could leave the City vulnerable to water resource fluctuation during historically dry months (July-September). Additionally, as temperatures rise and snowpack decreases, the dry season may manifest earlier in the year and extend later, leading to a longer season of water insecurity.

While projections generally show little change in total annual precipitation in California, even modest changes could have a significant effect on California ecosystems that are conditioned to historical precipitation levels. Reduced precipitation could lead to higher risks of drought, while increased precipitation could cause flooding and soil erosion (CNRA 2014). The City has an historical annual average (1950 to 2005) precipitation of 15.0 inches. The annual precipitation in the City is projected to be 15.7 to 17.8 inches by 2050, and 15.0 to 21.4 inches by 2099, depending upon the emissions scenario used for projections (CEC 2018).

DROUGHT AND GROUNDWATER

As of early 2018, the National Drought Mitigation Center classified a majority of Riverside County as being in a "severe drought," the third-most intense drought condition classification (National Integrated Drought Information System [NIDIS] 2018). Although precipitation projections tend to be less certain than other types of climate change projections, a slight decrease in average precipitation is expected in the region through midcentury (CEC 2013).

The City relies on numerous wells within the local groundwater basin as an important source of water supply to each of the retail water purveyors that serve the City and its sphere of influence. Major groundwater basins underlying the City include the Murrieta-Temecula Basin and the French Basin, which rely on surface streams for groundwater recharge (City 2011b). Increased average temperatures and changes in the timing, amounts, and snow/rain form of precipitation could affect local groundwater recharge. Groundwater use typically increases during droughts, which due to the uncertainty in the amount and timing of water availability could result in challenges in providing adequate groundwater supply to meet future demand (Western Riverside Council of Governments [WRCOG] 2014).

EXTREME STORMS

Changes in precipitation patterns may result in less frequent, but more extreme storm events (EPA 2017). The City is projected to experience a slight increase in overall precipitation which may fall with more intense characteristics (i.e., high volume over a short period of time with stronger wind patterns). These storms may produce higher volumes of runoff and contribute to increased flood risks and associated impacts.

1.1.3 Increased Wildfire Risk

Increased temperatures and frequency of extreme heat events, along with changes in precipitation patterns, can lead an increase in the frequency and intensity of wildfires (Governor's Office of Planning and Research

[OPR] 2018). The City is surrounded by relatively rural and undeveloped hillsides and ranches with a high potential for wildfires which can exacerbated by occasional Santa Ana winds and high temperatures (City 2011). Additionally, extreme weather conditions, such as high temperature, low humidity, and/or winds of extraordinary force, may cause an ordinary, localized fire to expand into a more intense and difficult to control wildfire.

The California Department of Forestry and Fire Protection (CAL FIRE) has developed the City's Fire Hazard Severity Zone Map, identifying Very High Fire Hazard Severity Zones in the City that are included in the Local Responsibility Area. The map shows that a substantial portion of the City, including areas along the western edge of the City at the base of the Santa Rosa Plateau and the northeastern rural City neighborhoods, are identified as Very High Fire Hazard Severity Zones (CAL FIRE 2009). The historic annual (1950 to 2005) mean hectares burned in Riverside County is 4,861.1 hectares or approximately 12,012 acres. The annual mean area burned is projected to increase by 15 percent by 2050 and by 11 percent by 2099 under the high-emissions scenario (CEC 2018).

In addition to increased threats to human safety, the increased threats to human safety, the increased frequency of wildfire results in the release of harmful air pollutants into the atmosphere, which dissipate and can affect the respiratory health of residents across a broad geographical scope. Particulate matter (soot and smoke), carbon monoxide, nitrogen oxides, and other pollutants are emitted during the burning of vegetation and can cause acute (short-term) and chronic (long-term) cardiovascular and respiratory illness, especially in vulnerable populations such as the elderly, children, agricultural and outdoor workers, and those suffering from pre-existing cardiovascular or respiratory conditions (OPR 2018).

1.1.4 Increased Flood Risk

Climate change is predicted to modify the frequency, intensity, and duration of extreme storm events, such as sustained periods of heavy precipitation and increased rainfall intensity during precipitation events. These projected changes could lead to increased flood magnitude and frequency. (IPCC 2014). The City lies within the inland portion of the Santa Margarita River Basin. Murrieta Creek and Temecula Creek are primary tributaries to this basin and flow through the City. Stream flows in Murrieta Creek, which flows southeasterly through the portion of the City that lies between Interstate 15 (I-15) and the base of the Santa Rosa Plateau, have been highly variable, and flooding frequently occurs in Historic Murrieta. Most areas along this creek and its associated tributaries lack formal flood control systems, as a result, drainage in some areas is dependent on natural features and can result in flooding in less developed areas, even with moderate rain (City 2011).

Increased precipitation and extreme storm events because of climate change, as described previously, would result in increased flood scenarios and major flooding events. The City's flooding potential will be exacerbated when experiencing atmospheric rivers, or narrow streams of warm, concentrated precipitation often resulting in the deposition of considerable rainfall over a short period of time. Expected increases in average temperature would increase the intensity and magnitude of atmospheric rivers, resulting in increased regional and localized flooding (Dettinger 2011).

1.2 STEPS 2 AND 3: SENSITIVITY AND POTENTIAL IMPACTS

For the purposes of this Vulnerability Assessment, Steps 2 and 3 are discussed together as they are closely related. Step 2 includes the use of systematic evaluation to identify populations, functions, and structures that may be affected by projected exposures to climate change impacts and their degree of sensitivity. These determinations are made with a simple "yes" or "no" answer. This evaluation uses the APG's recommended

sensitivity checklist, and focuses specifically on resources in the City potentially affected by climate change impacts identified in Section 1.1, "Step 1: Exposure."

APG's sensitivity checklist is organized into three main categories: Population, Functions, and Structures. These categories are described in detail below.

- **Population:** Includes both the general human population and segments of the population that are most likely to be sensitive or vulnerable to climate change impacts. This applies, particularly to non-English speaking or elderly populations who may require special response assistance or special medical care after a climate-influenced disaster, and disadvantaged communities.

- **Functions:** Includes facilities that are essential to the health and welfare of the whole population and are especially important following climate-influenced hazard events. These facilities include hospitals, medical facilities, police and fire stations, emergency operations centers, evacuation shelters, and schools. Transportation systems, such as airways (e.g., airports and highways), bridges, tunnels, roadways, railways (e.g., tracks, tunnels, bridges, and rail yards), and waterways (e.g., canals, seaports, harbors, and piers) are also important to consider. Lifeline utility systems such as potable water, wastewater, fuel, natural gas, electric power, and communications are also critical for public health and safety. Functions also include other economic systems such as agriculture, recreation, and tourism, as well as natural resources within a community, including various plant and animal species and their habitat.

- **Structures:** Includes the structures of essential facilities noted above such as residential and commercial infrastructure, institutions (i.e., schools, churches, hospitals, prisons, etc.), recreational facilities, transportation infrastructure, parks, dikes and levees, and water and wastewater treatment infrastructure. It also includes high potential loss facilities, where damage would have large environmental, economic, or public safety considerations (e.g., nuclear power plants, dams, and military installations). This category also includes hazardous material facilities that house industrial/hazardous materials.

An evaluation of the severity of climate change impacts on the sensitive populations, functions, and structures is included in Step 3. Given that climate change exposures at the local scale are inherently uncertain, the APG recommends that communities conduct a qualitative assessment that describes the potential impacts based on the exposure (CNRA 2012). This assessment is not meant to be exhaustive and prescriptive, rather, it is intended to provide a high-level view of potential impacts that occur as a result of identified climate change exposures. Further evaluation and research would be needed to more precisely identify points of sensitivity and potential impacts, including specific facilities, structures, and areas of concern.

1.2.1 Increased Temperature

The average maximum and minimum temperatures in the City are project to rise between approximately 5 to 10 °F by 2099. Increased temperatures can lead to secondary climate change impacts including increases in the frequency, intensity, and duration of extreme heat events and heat waves.

POPULATIONS

Higher frequency of extreme heat conditions can cause serious public health impacts, increasing the risk of conditions directly related to heat such as heat stroke and dehydration (OPR 2018). Exposure to excessive heat may lead to heat-related illnesses such as heat cramps, heat exhaustion, and heat stroke. The most serious reaction to extreme heat and heat stroke results in severe mental status changes, seizure, loss of consciousness, kidney failure, abnormal cardiac rhythm, and death (CalEPA 2013).

Higher temperatures also result in worsened air quality through increased air pollution. Ozone formation and particulate matter generation (e.g., from wildfire smoke), pose health hazards to vulnerable populations including children, the elderly, pregnant women, and persons with pre-existing chronic diseases. Based on the 2010 U.S. census, the City's population is 103,606 residents, approximately seven percent of which are children (under five years) and approximately 12 percent are elderly (65 years and over) (U.S. Census Bureau 2017).

Extreme heat events pose greater challenges to disadvantaged communities due to sub-standard living environments and limited access to resources. Low income populations living in aging buildings with poor insulation experience higher costs associated with air conditioning; some populations in these buildings may refrain from turning on air conditions to reduce these costs, making them more susceptible to health condition risks (Singer et al. 2016). Approximately nine percent of the City's population is currently considered to be living in poverty, and approximately 11 percent of the population under 65 years is without health insurance (U.S. Census Bureau 2017).

The climate change—related impacts to populations in the City would have the greatest impact on vulnerable populations. Approximately 20 percent of the City's population is considered vulnerable population (i.e. children and elderly), and at least 11 percent of the population is considered to live in poverty or does not have access to health insurance. Climate change will result in increased temperatures in the City, including increased heat waves and extreme heat events. Further, the City experiences large temperature increases compared to the adjacent rural areas due to the urban heat island effect. This urban heat island effect, on average, increases the temperature in the City an average of nearly 10 °F higher than the adjacent rural areas.

Severity of Impacts on Populations: ***High***

FUNCTIONS AND STRUCTURES

High temperatures decrease the efficiency of power transmission lines, while demand for electricity simultaneously goes up as operation of air conditioners and cooling equipment increases. This may result in increased risk of power outages and blackouts, affecting the operation of infrastructure. Prolonged exposure to heat can exacerbate roadway degradation, as asphalt and concrete can deform at a faster rate under high temperatures and can impact bridge expansion joints as they experience expansion and contraction as temperatures fluctuate.

Energy use in buildings increases as temperature increases as a result of increased demand for cooling systems. Temperature-related power failure can adversely affect the quality of working and living environments in residential, commercial, and industrial buildings. In periods of extreme heat, loss of electricity inhibits cooling of inside areas resulting in a lack of refuge from dangerous heat. Further, economic losses may be incurred from loss of productive work time due to downed communication systems or dangerous work conditions, or in residential buildings from an inability to properly store foods susceptible to spoiling in heat.

The production of agricultural products is a major activity in Riverside County. Agricultural activities can be highly vulnerable to the impacts of climate change, including drought conditions and extreme heat. In 2014, drought conditions cost agriculture in California approximately $2.2 billion, and costs may be substantially higher in the future if continued drought further depletes groundwater supplies (WRCOG 2014). Though agriculture represents a large portion of the regional economy, it is a relatively small sector of employment for individuals working or living in the City (U.S. Census Bureau 2015).

Severity of Impacts on Structures and Functions: ***Medium***

1.2.2 Changes in Precipitation Patterns

Increased average temperatures and a hastening of snowmelt in the Sierra Nevada, Rocky Mountains, and distant portions of watersheds could affect the flows of the State Water Project and the Colorado River upon which the City relies. Reduce flow of fresh water, more persistent drought conditions, and increased water demands due to population growth will likely affect the quality and quantity of water supplies.

POPULATIONS

Increasing temperatures and changes in precipitation may lead to intensified drought conditions, which decreases the availability and quality of water for human use. This includes increased exposure to health hazards including wildfires, dust storms, extreme heat events, flash flooding, and degraded water quality (CDPH 2017). Most of the imported water used in the region comes from the Sierra Nevada range. Reduced winter precipitation levels and snowpack reduction have resulted in less fresh water available for communities throughout California. Continued decline in snowpack is expected, which may lead to lower volumes of water available for City residents (WRCOG 2014).

Severity of Impacts on Populations: ***High***

STRUCTURES AND FUNCTIONS

Extreme weather events (e.g., storms, flooding) cause fatal and nonfatal injuries from drowning, being struck by objects, fire, explosions, electrocution, or exposure to toxic materials. A widespread weather-related natural disaster may destroy or ruin housing, schools, and businesses and cause temporary or permanent displacement (CDPH 2017). Changes in precipitation patterns may increase the presence of weeds, pest insects, and other organisms that damage agricultural products as well as affect agricultural yields and increase stress on crops and animals (WRCOG 2014)

Severity of Impacts on Structures and Functions: ***Medium***

1.2.3 Increased Wildfire Risk

Increased temperatures and changes in precipitation associated with climate change are expected to increase the potential severity of wildland fires both within and beyond the boundaries of the City. As previously described, the annual mean hectares burned is projected to increase by 15 percent by 2050 and by 11 percent by 2099 under the high-emissions scenario. As higher temperatures last for longer periods of time, dead fuels of wider diameter will also become drier and contribute to increased wildfire intensity (CAL FIRE 2009).

As the climate changes, the amount of area at elevated risk for such spatially limited hazards such as wildfires increases (CEC 2012). Areas that are currently vulnerable to wildfires may face more frequent hazards, and the wildfires themselves may be more severe. Wildfires may also begin to affect areas that are not currently vulnerable, and these risks may be exacerbated by high development pressure, resulting in more buildings and infrastructure built in high-risk areas (WRCOG 2014).

POPULATIONS

Different areas of the community and populations are especially vulnerable or resilient to wildfires in the City, particularly for hazards where rapid evacuation may be necessary. Factors that make residents or

employees more vulnerable to wildfire include individuals with disabilities, access to vehicles, income levels, buildings located in high-risk areas, and working conditions (WRCOG 2014).

Six percent of the City's population under 65 lives with a disability, and approximately nine percent of the City's population lives below the poverty level (U.S. Census Bureau 2017). Individuals with disabilities could have limited mobility and could be medically dependent on electronic devices. Physically disabled individuals may have limited mobility in case of evacuation, and respiratory problems could be aggravated by smoke. Low income individuals are less likely to have access to high quality housing units, support networks, or other resources that limit exposure to poor air quality or protect against fire. They are also less able to recover and rebuild their quality of life if fire results in the destruction of their property or affects their health.

In addition to increased threats to human safety, the increased risk of catastrophic wildfire results in the release of harmful air pollutants into the atmosphere, which dissipate and can affect the respiratory health of residents across a broad geographical scope. Particulate matter (soot and smoke), carbon monoxide, nitrogen oxides, and other pollutants are emitted during the burning of vegetation and can cause acute (short-term) and chronic (long-term) cardiovascular and respiratory illness, especially invulnerable populations such as the elderly, children, agricultural and outdoor workers, and those suffering from preexisting cardiovascular or respiratory conditions (CDPH 2017).

*Severity of Impacts on Populations: **High***

STRUCTURES AND FUNCTIONS

While periodic fires originate from natural processes and provide important ecological functions, catastrophic fire events that cannot be contained or managed can cause serious threats to homes and infrastructure, especially for properties located at the wildland-urban interface. Damage to ecological functions may result as the risk of fire increases. When rain falls in burn scarred areas, there is a higher potential for soil erosion and mudflows into roads, ditches, and streams, and potentially resulting in property damage or loss.

Increased industrial complexes, transportation networks, utility networks, and general development along the wildland-urban interface increases the risk for wildfires to affect structures. Hazardous materials, associated with the development of industrial buildings and potentially present along transportation networks could increase the risk associated with wildfires (County of Riverside [County] 2012). The undeveloped hillside areas in and adjacent to the City present a potentially serious hazard due to the high potential for large scale wildland fires. The western boundary of the City has high wildland fire threats and is currently developed with various low-density residential neighborhoods.

Wildfires often result in the closure of roadways and/or damage to transportation infrastructure which may cause increased congestion or delay during and for months after a wildfire event. Road closures could create additional issues related to evacuating affected areas, and providing emergency vehicle access to affected buildings and populations.

*Severity of Impacts on Structures and Functions: **High***

1.2.4 Increased Flood Risk

The City is located within the inland portion of the Santa Margarita River Basin. Murrieta Creek and Temecula Creek are the main tributaries of the Santa Margarita River. Stream flows for Murrieta Creek have been highly variable and flooding frequently occurs along sections that lack formal flood control, even in moderate rain. A total of 1,021.2 acres in the City are within the 100-year flood zone. Portions of the City are

also subject to potential flooding in the event of dam failure at Lake Skinner or Diamond Valley Lake (City 2012). While it is uncertain exactly how climate change will affect flooding events in the City and to what extent, any increase in flooding is likely to have serious ramifications as the area is already vulnerable.

The rivers in western Riverside County are typically dry or nearly dry for most of the year and generally only pose flood threats to developments within the floodplain during general storms of long duration. Increased urbanization and the resulting increase in impervious surfaces has increased flood potential (County 2014).

POPULATIONS

Flooding will most adversely affect populations living in 100-, 200-, and 500-year floodplains. Flood events can result in population displacement, death from drowning, injuries, and water- and food-borne diseases from sewage overflow (CDPH 2017). Populations with limited mobility (e.g., dependent on public transportation, without a vehicle) are considered more vulnerable to flood events because the ability to use sandbags or evacuate is reduced. Flooding could result in the release of sewage and hazardous and/or toxic materials if wastewater treatment plants are inundated, storage tanks are damaged, or pipelines are severed (WRCOG 2014). Flash flooding could occur as a result of heavy rain on burn scarred areas, and regular flooding already occurs in certain areas of the City. In the event of a normal flood condition, residents would have advanced notice to the threat of rising flood waters, providing adequate time to prepare and/or evacuate. While areas of the City are threatened by increased flooding, the population would generally have adequate time to identify and react to direct threats to their health and safety.

Severity of Impacts on Populations: ***Medium***

STRUCTURES AND FUNCTIONS

Increased flooding associated with climate change will stress communities and infrastructure, and may also threaten the biodiversity that occurs along the streams and creeks within the City. Unlike natural flooding regimes, wherein seasonal flooding results in the deposition of useful sediment (resulting in increased soil fertility as well as groundwater recharge), flash flooding and increased flood events could lead to the destruction of crops along streams, erosion of topsoil, and excessive soil saturation.

Flooding may also result in economic losses through closure of businesses and government facilities, disrupt communications and the provision of utilities, and result in increased expenditures for emergency services. Roadways exposed to high volumes of water become more susceptible to damage from excess moisture (California Department of Transportation [Caltrans] 2013).

Severity of Impacts on Structures and Functions: ***Medium***

1.3 STEP 4: ADAPTIVE CAPACITY

The evaluation of the adaptive capacity of populations, functions, and structures identified in Steps 2 and 3 involves determining a community's current ability to address the points of sensitivity and impacts associated with climate change. This step includes a review of the City's existing policies, plans, programs, resources, and institutions to reflect its current ability to adapt to climate change and reduce vulnerability. Adaptive capacity to each of the climate change impacts is rated low, medium, or high. A low adaptive capacity indicates that a community is unprepared, while a high adaptive capacity indicates that sufficient measures are already in place to address the points of sensitivity and impacts associated with climate change.

The City, County, and WRCOG address current and future impacts related to existing natural hazards through their planning processes. The following plans, produced by these agencies, address various hazards and climate change impacts at local and regional levels.

- The City Safety Element (Chapter 14 of the City's General Plan Update) describes hazards that exist in the City and the measures being taken to address them.
- The City Emergency Operations Plan (EOP) addresses the planned response to extraordinary emergency situations associated with natural disasters, technological incidents, and national security emergencies in or affecting the City. The EOP establishes the framework for implementation of State emergency management systems.
- The City of Murrieta Local Hazard Mitigation Plan (LHMP), produced by the County, identifies vulnerabilities, provides recommendations for prioritized mitigation actions, evaluates resources and identifies shortcomings, and provides future mitigation planning for the City.
- The WRCOG has created the Subregional Climate Action Plan (Subregional CAP) Adaption and Resiliency Strategy, providing an overview of expected climate change effects, assets in the subregion that are vulnerable to climate change effects, and adaptation strategies intended to reduce vulnerability and increase resilience. The strategies provided represent actions that increase resilience to natural hazards regardless of the rate and severity of climate change.

1.3.1 Adaptive Efforts Related to Increased Temperature

Efforts occurring in the City to adapt to or reduce the impacts of extreme heat days, heat waves, and urban heat islands are summarized below:

- The U.S. Department of Energy (DOE) Weatherization Assistance Program (WAP) provides grants to states, territories, and Native American tribes to improve the energy efficiency of low-income homes. Recipients then contract with local governments and nonprofit agencies to provide weatherization services to low-income homes in need of energy upgrades (DOE n.d.). The California WAP program allocates funds to various local governments, which provide grants to the entities that apply for them. WAP-related upgrades (e.g., replacing windows, weather-stripping, insulating attics and water heaters) in Sacramento County are provided by various organizations such as the Community Resource Project, Inc. and GRID Alternatives. Increasing the affordability of energy appliances provides low-income residents the financial capacity to air condition their homes during times of high heat. The State Greenhouse Gas Reduction Fund (GGRF) also provides funding for weatherization, residential rooftop solar and tree planting in disadvantaged communities.
- The County and City participate in the Home Energy Opportunity (HERO) Program, which is a part of the Property Assessed Clean Energy Program. HERO helps homeowners reduce energy bills and decrease water consumption through special financing options.
- WRCOG, in collaboration with Riverside Public Utilities, offers incentives for residential customers to upgrade the efficiency of a variety of equipment within eligible homes. The program encourages residents to upgrade appliances, building materials, and home furnishings with high-efficiency products to reduce water and energy use.
- The Subregional CAP includes the following recommended adaption strategies related to increased temperatures, extreme heat days, heat waves, and urban heat islands:
    - Strategy 1.3: Incorporate extreme heat and air quality annexes into emergency management plans.

- Strategy 2.4: Identify and map cooling centers in locations accessible to vulnerable populations and establish standardized temperature triggers for when they will be opened.
- Strategy 2.5: Identify ways for individuals with restricted mobility to reach cooling centers.
- Strategy 3.4: Work with local volunteer emergency response teams to include extreme heat as a hazard of concern and update core competencies to address the health-related risks of extreme heat events.
- Strategy 4.1: Use materials and features in transportation infrastructure that can improve resiliency to extreme heats.
- Strategy 6.1: Promote and expand the use of drought-tolerant green infrastructure, including street trees, and landscaped areas as part of cooling strategies in public and private spaces.
- Strategy 6.2: Amend the local development code to require high-reflectivity pavement or increased tree cover in large commercial parking lots.

The City and region have numerous adaptation plans and services available for extreme heat events and heat waves (i.e., cooling centers, heat wave advisories), and the City is improving the means by which residents are educated about existing plans (i.e. improved alert systems to notify residents of cooling center locations and extreme temperature events). In general, many of the policies and plans provide only recommendations to improve energy efficiency and reduce the impacts of temperature increases.

Adaptive Capacity for Increases in Temperature: ***Medium***

1.3.2 Adaptive Efforts Related to Changes in Precipitation

Efforts occurring in the City to adapt to or reduce the impacts of precipitation changes, extreme storms, and droughts are summarized below:

- The City has one designated severe weather center which is open and accessible when a Public Health "Heat/Cold Warning" is issued. The City utilizes the County Public Health Department heat and cold advisories to activate the center. The City also utilizes protocols to ensure the safety of residents during extreme residents such as "spray downs" during extreme heat events at large gatherings.
- The County and City participate in the HERO Program, which is a part of the Property Assessed Clean Energy Program. HERO helps homeowners reduce energy bills and decrease water consumption through special financing options.
- The City and its Community Services District have taken proactive measures to reduce water costs and use by replacing old technology for irrigation, exchanging overhead spray systems with drip (point-to-point) irrigation, and by replacing outdated landscaping with water-wise material. The City also provides information to residents on water consumption rebates provided by the various water districts serving the community.
- WRCOG, in collaboration with Riverside Public Utilities, offers incentives for residential customers to upgrade the efficiency of a variety of equipment within eligible homes. The program encourages residents to upgrade appliances, building materials, and home furnishings with high-efficiency products to reduce water and energy use.

- The Subregional CAP includes the following recommended adaption strategies related to changes in precipitation, extreme storms, and droughts:
  - Strategy 4.1: Use materials and features in transportation infrastructure that can improve resiliency to extreme events.
  - Strategy 5.5: Encourage the use of low-impact development practices in new development.
  - Strategy 6.1: Promote and expand the use of drought-tolerant green infrastructure, including street trees, and landscaped areas as part of cooling strategies in public and private spaces.
  - Strategy 6.3: Identify and implement municipal renewable energy projects for daily and emergency operations.
  - Strategy 7.2: Encourage efficient irrigation techniques and identify financial resources to support installation.
- Beginning in 2016, all retail water suppliers were required to comply with the water conservation requirements in Senate Bill X7-7 to be eligible for state water grants or loans. Each district is required to set targets and track progress toward decreasing daily per capita urban water use in an effort to meet the State's 20 percent water reduction goal. The City receives its water supply from four water districts: Rancho California Water District, El Sinore Valley Municipal Water District, Western Municipal Water District, and Eastern Municipal Water District. Each district has prepared and updated an urban water management plan for their respective service areas.

The City and region provide opportunities to reduce water usage in the community. The City is served by multiple retail water provides which reduces the City's ability to control the adaptability of its water supply to meet future demands or respond to threats. The City participates in various programs that assist with the reduction in residential energy and water usage. The City's municipal code has also incorporated adaptation measures into building and infrastructure design to improve water and landscaping efficiency (City municipal code 16.28 "Landscaping Standards and Water Efficient Landscaping")

Adaptive Capacity for Changes in Precipitation: ***Medium***

1.3.3 Adaptive Efforts Related to Increased Wildfire Risk

Efforts occurring in the City to adapt or reduce the impacts of wildfires are summarized below:

- The Murrieta Fire Department (Murrieta Fire and Rescue, MFR) engages in activities that are aimed at preventing fires and compliance with California Building Standards Code, Chapters 7 and 7A, and the California Fire Code. The MFR provides fire protection engineering, building inspections for code compliance, and hazardous materials inspections. The MFR also provides education and training in public safety and emergency preparedness.
- The MFR implements a Weed Abatement Program to reduce weed and brush fire hazards. This program provides for property inspections and enforcement on properties that pose a potential fire hazard due to weeds and brush.
- Conditions of development are currently required in the City under Title 15.24, "California Fire Code and California Fire Code Standards", of the City municipal code, such as Class A roofing (defined as the highest level of fire resistant roofing material, rated by ASTM E108) noncombustible siding, and 100-foot fuel buffer zones.

- The Subregional CAP includes the following recommended adaption strategies related to wildfire risk:
  - Strategy 5.1: Continue to provide information to homeowners about statutory vegetation management requirements.
  - Strategy 5.3: Establish neighborhood and building design standards that minimize fire hazards in high wildfire risk areas
- The City's LHMP includes the following objectives related to wildfire risk:
  - Objective 5.1: Continue efforts to reduce fire hazards associated with older buildings, multifamily housing, and fire-prone industrial facilities throughout the City.
  - Objective 5.2: Provide public safety education programs through the MFR to reduce accidents, injuries and fires, as well as train members of the public to respond to emergencies.
  - Objective 5.3: Continue to coordinate fire protection services with Riverside County, CAL FIRE, and all other agencies and districts with fire protection powers.
  - Objective 5.4: Ensure that outlying areas in the City can be served by fire communication systems as new development occurs.

A majority of the City's efforts to adapt to wildfire impacts of climate change correspond with general best practices for wildfire management and prevention. The City's adaptation strategies provide measures that reduce wildfire risk to people and property within the City. Climate change is projected to exacerbate the risk due to increased temperatures and changes in precipitation patterns. The City, with the assistance of the County, will need to continue to adapt to reduce these effects. The City currently has no defined emergency routes which reduces the capacity of the City to react during wildfire events.

Adaptive Capacity for Wildfire Risk: ***Medium***

1.3.4 Adaptive Efforts Related to Increased Flood Risk

Efforts occurring in the City to adapt or reduce the impacts of flooding are summarized below:

- The City's regulations with respect to flood damage prevention are included in the Murrieta Municipal Code Chapter 15.56, "Flood Damage Prevention Regulations." The purpose of this chapter is to promote the public health, safety, and general welfare, and to minimize the public and private losses due to flood conditions in specific areas.
- The City is located within Flood Control District Zone 7 of the Riverside County Flood Control and Water Conservation District. A Master Drainage Plan prepared for Murrieta Creek by the District evaluates drainage needs and proposes an economical drainage plan to provide flood protection for both existing and future development in the City. Improvements proposed for Murrieta Creek consist of the channelization of the creek and its major tributaries and include several concrete- lined open channels and a small network of underground storm drains.
- The City participates in the National Flood Insurance Program's (NFIP) Community Rating System (CRS) which provides a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed minimum NFIP requirements. Participation in this program provides discounted flood insurance premium rates to reflect the reduce flood risk resulting from the community actions.

- In 1997, the U.S. Army Corps of Engineers initiated studies on Murrieta Creek resulting in the Murrieta Creek Flood Control, Environmental Restoration and Recreate Project. Limited funding has been appropriated for the construction of this project.
- The Subregional CAP includes the following recommended adaption strategies related to flood risk:
  - Strategy 5.2: Encourage retrofits of hardscaped areas to use permeable paving.
  - Strategy 5.4: Restore riparian corridors, soft-bottomed streambeds, and seasonal flood basins that reduce flood hazards.
  - Strategy 5.5: Encourage the use of low-impact development practices in new development.
  - Strategy 5.6: Avoid siting important infrastructure in or near flood areas.
- The City's LHMP includes the following objectives related to flood risk:
  - Objective 3.1: Cooperate with the Riverside County Flood Control and Water Conservation District to evaluate the effectiveness of existing flood control systems and improve these systems as necessary to meet capacity demands.
  - Objective 3.2: Actively participate in and strongly promote timely completion of regional drainage plans and improvement project which affect the City.
  - Objective 3.3: Identify natural drainage courses and designate drainage easements to allow for their preservation, or for the construction of drainage facilities if needed to protect the health, safety, and welfare of the community.
  - Objective 3.4: Require new construction within the 100-year floodplain to meet National Flood Insurance Program standards.
  - Objective 3.5: Develop and maintain floodplain inundation evacuation plans in cooperation with the Riverside County Flood Control and Water Conservation District and the Murrieta Fire Department.
  - Objective 3.6: Maintain an active swift water rescue response in the Murrieta Fire Department.

City residents living in areas at high-risk for flooding or dam inundation have limited adaptive capacity to deal with flooding. Structural improvements to modify or elevate homes and other structures as well as the purchase of flood insurance can reduce the financial burden of recovering from flooding, however, these options are not universally acquirable. Low-income, mobility-challenged, and physically- or linguistically-isolated persons are particularly vulnerable. Ultimately, the safety of City residents will be dependent on proper execution of evacuation procedures and durability of the systems in place to prevent flooding. Localized and tributary flooding will impact those living in near proximity to creeks and streams, as well as areas with older and constrained infrastructure that could back up when capacity is reached. The City is currently in the process of upgrading drainage infrastructure.

Adaptive Capacity for Flood Risk: ***Medium***

1.4 STEP 5: RISK AND ONSET

Risk and the project timeframe for which impact would occur is ranked by the likelihood or probability that a certain magnitude/extent/scale of a potential impact would occur. Risk is determined by a combination of

the estimate certainty of the science projecting the climate change impact and the certainty of sector (i.e., population, function, structure) sensitivity. This risk is ranked low, medium, or high. Certainty ratings are based on percent probability of global models created by IPCC (CNRA 2012a:29). The timeframe in which the impact is most likely to occur (based on risk) can be categorized as:

- Current: Impacts currently or imminently occurring (2018-2020)
- Near-term: 2020-2040
- Mid-term: 2040-2070
- Long-term: 2070-2100

The risk certainty for the City and the timeframe of potential climate change exposures is summarized in Table 1.4-1

Table 1.4-1 Risk and Onset for the City of Murrieta Climate Change Impacts

Impact	Certainty Rating	Timeframe
Increased Temperatures	High	Current
Increased Frequency in Extreme Heat Events	High	Near-Term
Increased Frequency in Heat Waves	High	Near-Term
Increased Urban Heat Island Effect	High	Current
Changes to Precipitation Patterns	Medium	Current
Increased Frequency in Drought	Medium	Mid-Term
Increased Frequency of Severe Storms	Medium	Mid-Term
Increased Wildfire Risk	High	Near-Term
Increased Flood Risk	Medium	Mid-Term

The table shows that increased temperature, increased frequency of heat waves and extreme heat events, and the increased wildfire risk are of high certainty rating. Temperature- and wildfire-related impacts are the most likely near-term climate change exposures facing the City and should be addressed and prioritized first in future adaption planning efforts. With populations increasing and water supply already strained in the region, future meteorology, snowpack, streamflow, and groundwater conditions should continue to be examined more closely with actions taken to enhance the conservation and management of water supply and storage.

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